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The Mineral Industry of Pennsylvania in 1965

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The Mineral Industry of Pennsylvania

This chapter has been prepared under a cooperative agreement between the Bureau of Mines, U.S. Department of the Interior, and the Pennsylvania Bureau of Topographic and Geologic Survey for collecting information on all minerals except fuels.

By Charles C. Yeloushan [1]

The value of mineral production in Pennsylvania for 1965 totaled $913.8 million, a $11.8 million increase over that of 1964. Production of bituminous coal accounted for 45 percent of the total value, showed the greatest value increase for an individual commodity, $19 million. Cement, sand and gravel, and stone industries, accounting for 28 percent of the total value, increased significantly from the previous year's production owing to the greater demand for raw materials in iron and steel manufacture, roadbuilding, and private and public building construction. The cement industry regained its loss of $3.8 million from 1963 to 1964 with a $3.9 million gain from that of 1964 to 1965. The sand and gravel industry continued to increase steadily at an annual rate of about $3 million in value. The stone industry also continued its strong steady growth with an $8.6 million increase over that of 1964.

Anthracite mining had the greatest decline in recent years with a value loss of $26.6 million from that of 1964. For the first time since accurate records of anthracite production were reported in 1870 annual production fell below 15 million tons. Anthracite output had reached an alltime peak in 1917 with nearly 100 million tons produced, but has fallen steadily since, producing 90 million tons in 1920, 69 million tons in 1930, 51 million tons in 1940, 44 million tons in 1950, 19 million tons in 1960, and 14.9 million tons in 1965. The unusually high exports of 3.4 million tons in 1963 dropped to less than 1 million tons in 1965.

Other individual commodities reporting declines in total production and value from 1964 were natural gasoline, crude petroleum, and zinc.

REVIEW BY MINERAL COMMODITIES

MINERAL FUELS

Coal (Anthracite).—Anthracite production decreased 13 percent in tonnage and 18 percent in value from that of 1964. Strip pits accounted for 40 percent of the production, underground mines 35 percent, culm banks 20 percent, and river dredging 5 percent. Of the underground production, 61 percent was mechanically loaded and 39 percent hand loaded. Of the anthracite loaded mechanically underground, 403 conveyors and pit-car loaders (including duckbills and other self-loading conveyors) accounted for 60 percent of the production, 155 scraper loaders for 28 percent, and 25 mobile loaders for 12 percent.

By regions, Schuylkill accounted for 49 percent of the total production, Wyoming for 31 percent, and Lehigh for 20 percent. All of the dredging came from the Schuylkill region, 88 percent from the Susquehanna River and tributaries, and 12 percent from the Schuylkill River and tributaries

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Table 1.—Mineral production in Pennsylvania [1]

Mineral	1964 Quantity	1964 Value (thousands)	1965 Quantity	1965 Value (thousand
Cement:				
Portland ---376-pound barrels--	37,662,763	$113,409	40,153,219	$116,925
Masonry ---280-pound barrels--	2,817,796	7,594	3,005,105	7,991
Clays [2] ---short tons--	3,187,100	15,814	3,394,222	17,697
Coal:				
Anthracite ---short tons--	17,184,251	148,648	14,865,955	122,021
Bituminous ---do----	76,530,758	388,218	80,308,449	407,267
Copper ---do----	3,614	2,356	4,354	3,083
Gem stones	NA	4	NA	4
Lime ---short tons--	1,440,285	20,656	1,568,492	22,496
Natural gas ---million cubic feet--	r 81,720	22,349	84,461	22,551
Natural gas liquids:				
Natural gasoline and cycle products thousand gallons--	1,138	64	1,022	55
LP gases ---do----	1,481	100	1,683	109
Peat ---short tons--	39,500	397	45,600	527
Petroleum (crude) ---thousand 42-gallon barrels--	5,113	22,088	4,922	21,263
Sand and gravel ---short tons--	16,199,000	26,414	18,502,000	29,606
Stone ---do----	52,829,268	91,075	56,806,160	99,627
Zinc [3] (recoverable content of ores, etc.) --do----	30,754	8,345	27,635	8,014
Value of items that cannot be disclosed: Clays (kaolin), cobalt, gold, iron ore, mica, pyrites, sericite-schist, silver, and tripoli	XX	34,519	XX	34,587
Total	XX	902,050	XX	913,823

r Revised. NA Not available. XX Not applicable.

[1] Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

[2] Excludes kaolin; included with "Value of items that cannot be disclosed."

[3] Recoverable zinc valued at the yearly average price of prime western slab zinc, East St. Lou market. Represents value established after transportation, smelting, and manufacturing charg have been added to the value of ore at the mine.

at an average value for all dredging of $3.34 per ton. Production from the Lehigh region preparation plants averaged $8.80 per ton, Schuylkill region preparation plants $7.75 per ton, and Wyoming region preparation plants $9.24 per ton. Average value for all anthracite production was $8.21 per ton. Of the total production, 51 percent was shipped by truck, 48 percent by rail, and 1 percent was used as colliery fuel.

The leading county in anthracite production was Luzerne with 37 percent of the total tonnage, followed by Schuylkill with 35 percent and Northumberland with 11 percent. There were eight fatal accidents in the anthracite mines in 1965 (16 less than 1964) for a frequency rate of 0.51 per million man-hours of exposure. Nonfatal accidents totaled 1,135 (207 less than 1964) for a frequency rate of 71.65 per million man-hours of exposure. Of the eight fatal accidents, five were due to falls of face, rib or roof, two from an inrush of surface material saturated with water, one from haulage, and all occurred underground. Four of the five face, rib, or roof fatalities were at mines employing 15 more persons underground, and one was a mine employing three persons.

Employment at anthracite operatio (including operations of strip contractor totaled 11,132 men, a decrease of 2,012 me from 1964; 4,501 men underground (6 less than 1964), 2,349 men in strip pi (726 less than in 1964), 566 men at cul banks (8 less than 1964), 2,047 men

Table 2.—Value of mineral production in constant 1957–59 dollars

(Millions)

Year	Value
1956	$1,105
1957	1,058
1958	889
1959	891
1960	862
1961	839
1962	869
1963	r 918
1964	r 956
1965	p 967

p Preliminary.
r Revised.

paration plants (366 less than 1964), 72 men at other surface (209 less than 4), and 97 men on dredge operations less than 1964). The men worked an rage of 204 days throughout the year a total of 2.3 million man-days. An rage of 6.55 tons per man-day was pro-ced compared with 6.11 tons produced 1964.

Consumption of anthracite by the elec- utilities decreased 4 percent from that 1964 while use of anthracite for carbon-izing (coke plants) increased 3 percent. Exports (not including shipments to military forces) totaled only 851,000 tons, a 46-percent decrease from that of 1964. Retail dealer deliveries totaled 3.1 million tons, a 6-percent decrease from that of 1964 while stocks in retail dealer yards decreased 14 percent.

Coal (Bituminous).—Production of bituminous coal increased 5 percent in tonnage and value from 1964. Coal sold in the open

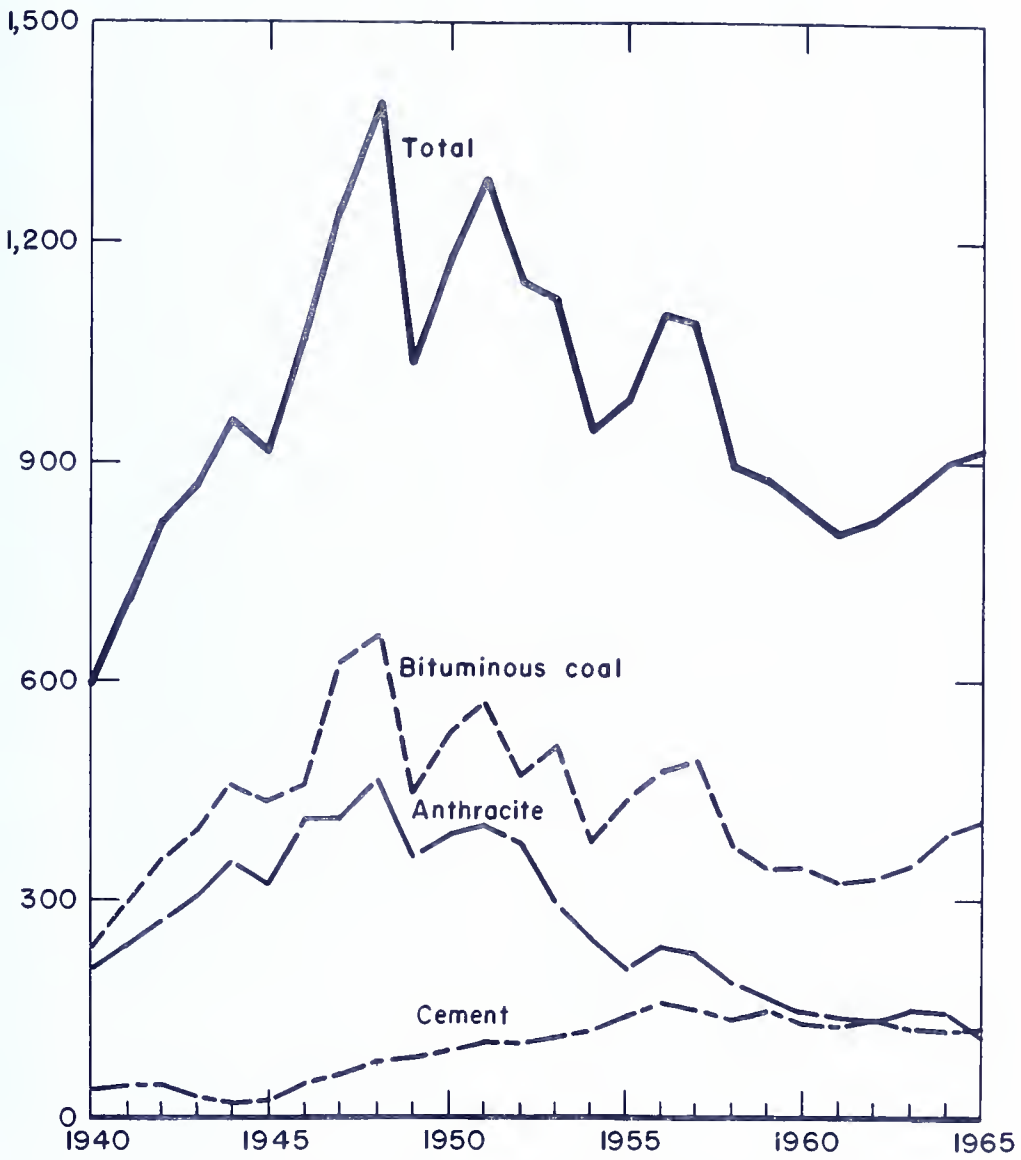

Figure 1.—Value of bituminous coal, anthracite, cement, and total value of mineral production in Pennsylvania.

Table 3.—Employment and injury experience in the mineral industries

Year and industry	Average men working daily	Days active	Man-days worked (thousands)	Man-hours worked (thousands)	Number of injuries		Injury rates per million man-hou	
					Fatal	Nonfatal	Frequency	Seve
1964:								
Bituminous coal	24,959	222	5,529	44,523	18	896	20.53	4,
Anthracite	13,144	214	2,812	20,368	24	1,342	67.07	9.
Peat	52	231	12	95	---	2	21.01	19,
Metal	1,451	291	422	3,467	1	38	11.25	2,
Nonmetal	1,780	244	434	3,504	1	125	35.96	3,
Sand and gravel	1,179	233	273	2,297	---	48	20.90	
Stone	7,984	271	2,164	17,948	3	303	17.05	1,
Total	50,549	230	11,646	92,202	47	2,754	30.38	4,
1965: [p]								
Bituminous coal	24,400	226	5,514	44,630	35	910	21.17	6,
Anthracite	11,132	204	2,271	16,375	8	1,067	65.65	4,
Peat	59	186	11	90	---	1	11.05	
Metal	1,475	285	420	3,467	---	27	7.77	
Nonmetal	1,735	249	433	3,497	2	137	39.75	4,
Sand and gravel	1,210	233	282	2,368	---	48	20.27	
Stone	8,435	269	2,265	18,758	6	303	16.47	2,
Total	48,446	231	11,196	89,185	51	2,493	28.52	4,

[p] Preliminary.

market averaged $4.19 per ton (a $0.03 increase from that of 1964) and comprised 61 percent of the total tonnage. Coal not sold in the open market averaged $6.48 per ton (a $0.02 decrease from that of 1964) and accounted for the remaining 39 percent of the total tonnage. Average value for all bituminous coal produced was $5.07 per ton (same as that of 1964).

Underground mining accounted for 69 percent of the total output, strip for 30 percent, and auger for 1 percent. Mine count totaled 1,140 (17 more than 1964); 494 were underground mines (43 less than 1964), 581 were strip (71 more than 1964), and 65 were auger (11 less than 1964). Of the total output, 69 percent was mechanically cleaned: 87 percent of the underground coal, 28 percent of the strip coal, and 29 percent of the auger coal.

Of the coal mechanically cleaned, 65 percent was cleaned by wetwashing other than by jigs, 19 percent by pneumatic methods, and 16 percent by jigs. Coal was cleaned at 102 preparation plants (5 more than 1964), of which 17 plants (2 more than 1964) conducted thermal drying and dried 8.1 million tons of coal (1.2 million tons more than 1964).

Of the total output, 52 percent was crushed at 214 mines or plants and 10 percent was treated with oil, calcium chloride, or other materials at 63 plants; 78 perc was shipped to market by rail or water percent by truck, and 2 percent by ot means.

Of the underground output, 97 perc was loaded mechanically, of which 408 c tinuous miners (with 97 mobile loade accounted for 81 percent of the mecha cally loaded tonnage, 189 mobile load machines for 18 percent of the tonna and 146 hand-loaded face conveyors, du bills, self-loading conveyors and scra loaders for 1 percent of the tonnage. I chanical loading was carried out at mines (8 more than 1964). In additi 504 cutting machines (84 less than 19 cut 21 percent of the underground t nage, while less than 1 percent of the t age was shot from the solid and cut hand; 449 hand-held and post-moun drills (79 less than 1964) drilled 9 perc of the underground tonnage; 44 mol drills (10 less than 1964) drilled 12 p cent of the underground tonnage; 270 tary and 242 percussion drills were u for roof bolting, and 28 rotary and percussion drills were used for other p poses. Underground haulage was acc plished by 1,321 electric trolley locor tives, 84 electric battery locomotives, a 11 other locomotives; 119 rubber-tired tr tors; 22,634 rail mine cars with an aver capacity of 5 tons and 192 rubber-ti

e cars with an average capacity of 3 s; 618 miles of main line track and 316 es of secondary track; 979 cable-reel ttle cars, 14 battery shuttle cars, and 17 ttle buggies; 557 conveyors with an rage length of 1,553 feet.

trip mining equipment included 2 elec-, 11 diesel-electric, 692 diesel, and 61 bline power shovels, and 10 electric, 25 el-electric, 354 diesel, and 7 gasoline-glines for a grand total of 1,162 power vels and draglines (79 less than 1964); power shovels had less than a 3 cubic-l bucket capacity, 62 shovels had from 5 yards' capacity, 4 shovels had from 6 12 yards' capacity, and 3 shovels had r 12 yards' capacity; 94 draglines had than 3 yards' bucket capacity, 149 glines from 3 to 5 yards, 140 draglines n 6 to 12 yards, and 13 draglines over yards of bucket capacity; 8 carryall ipers, 762 bulldozers, 101 horizontal and vertical power drills, and 1,495 trucks h an average hauling capacity of 14 s and an average one-way hauling dis-ce of 7 miles were in use.

Auger mining equipment included 75 gers, 8 diesel and 1 gasoline power shov-with bucket capacities of less than 3 bic yards, 38 bulldozers, 6 horizontal and vertical drills, and 83 trucks with an rage hauling capacity of 14 tons and uling an average one-way distance of 6 les.

Fatal injuries rose from 18 in 1964 to 35 1965, while nonfatal injuries fell from 35 to 1,015; injury-frequency rates per llion man-hours of exposure rose from 7 to 0.73 for fatalities and fell from 53 to 21.09 for nonfatalities. Of the fatal uries, 30 occurred underground, 1 at face facilities associated with under-ound mines, and 4 at strip mines. Of the derground fatalities, 16 were due to falls the roof, 8 to haulage, 3 to machinery, 1 mine fires, and 2 to other causes. The rface fatality was a haulage accident. rip fatalities were listed under two from achinery accidents and two from other uses.

Washington County continued to be the ading coal producer, followed by Greene, mbria, Clearfield, and Indiana Counties. tuminous coal also was mined in 23 her counties.

Plans were announced by Pennsylvania ectric Co. and New York Electric & Gas Co. to build a mine-mouth generating plant near Homer City in Indiana County. The site is 12 miles northwest of the projected Conemaugh mine-mouth plant and 15 miles southeast of the Keystone plant, now well under construction. The new plant is expected to use 3.5 million tons of coal annually, to be similar in design to the Keystone and Conemaugh plants, and to increase to more than 5 million kilowatts the total coal-fired generating capacity in the Indiana-Johnstown area. The Keystone and Conemaugh plants are each expected to consume over 5 million tons of coal annually, which, along with this new plant, will bring the total new coal consumed in the area to about 14 million tons annually by the early 1970's.

Coke and Coal Chemicals.—Oven-coke production totaled 18.9 million tons, a 7-percent increase over that of 1964, and beehive-coke production totaled 879,600 tons, a 57-percent increase over that of 1964 and 129-percent increase over that of 1963. Twelve oven-coke plants were in operation with 3,419 ovens in existence at yearend (243 ovens fewer than in 1964). Of the 3,419 slot ovens, 660 were Koppers, 1,546 were Koppers-Becker, 88 were Semet-Solvay, and 1,125 were Wilputte. Oven-coke operations carbonized 27.0 million tons of coal (with an average value of $8.54 per ton) and had a 70.11-percent yield of coke from coal, with an average value for coke at the ovens listed at $15.45 per ton ($1.57 a ton less than in 1964). Twelve beehive-coke plants were in operation with 2,200 ovens in existence at yearend (1,600 ovens were abandoned during the year) carbonizing 1.4 million tons of coal (with an average value of $5.56 per ton) and had a 61.87-percent yield of coke from coal. Beehive coke had an average value at the ovens of $13.94 per ton ($0.46 per ton more than in 1964).

Of the 27.3 million tons of coal received by oven-coke plants, 74 percent was high-volatile, 20 percent low-volatile, and 6 percent medium-volatile; 54 percent originated in Pennsylvania, 41 percent in West Virginia, 4 percent in Virginia, and 1 percent in Kentucky. Oven-coke producing companies used 17.4 million tons in blast furnaces and 19,000 tons for other purposes and sold 807,000 tons commercially to blast-furnace plants, foundries, other indus-

trial plants, and retail dealers for residential heating. Of the 15.6 million tons of oven and beehive coke distributed in Pennsylvania, 15.3 million went to blast-furnace plants, 144,000 tons to foundries, 123,000 tons to other industrial plants, and 15,000 tons for residential heating.

Production of breeze recovered at coke plants totaled 869,500 tons at an average value of $6.39 per ton. Of the breeze used by producers, 470,000 tons were used in agglomerating plants, 86,300 tons in steam plants, and 60,300 tons in other industrial uses. Breeze sold on the open market totaled 238,800 tons at an average of $6.89 per ton. Stocks of breeze on hand at yearend totaled 259,900 tons.

Coke-oven gas production totaled 290.7 billion cubic feet, a 7-percent increase over 1964. Coke-oven gas producers used 113.5 billion cubic feet in heating ovens, 29.6 billion cubic feet under boilers, and 141.5 billion cubic feet in steel or allied plants and sold 3.5 billion cubic feet for industrial use or distribution through city mains.

Coal chemicals produced at the oven-coke plants included 246,000 tons of ammonium sulfate equivalent; 255 million gallons of tar; and 82 million gallons of crude light-oil, from which were derived 45.4 million gallons of benzene, 11.6 million gallons of toluene, 3.7 million gallons of xylene, and 3.7 million gallons of solvent naphtha.

Koppers Co., Inc., Pittsburgh, Pa., has been awarded a contract by the Alan Wood Steel Co., Conshohocken, Montgomery County, to rebuild a battery of 55 coke ovens. The new ovens will replace Alan Wood's No. 3 battery, originally constructed by Koppers in 1919. The present battery will be taken out of service and the new ovens will be charged in April.

Natural Gas Liquids.—Natural gas liquids production totaled 2.7 million gallons, a 3-percent increase over that of 1964. Liquefied petroleum gases and ethane final (manufactured at natural gasoline plants) accounted for 62 percent of the production while natural gasoline and cycle products accounted for the remaining 38 percent. Liquefied petroleum gases were listed at 6.5 cents per gallon compared with 6.8 cents in 1964, and natural gasoline was listed at 5.4 cents per gallon compared with 5.6 cents in 1964. Proved reserves of natural gas liquids totaled 1.3 million barrels yearend, a 5-percent decrease from yeare reserves in 1964. Underground-storage pacity for liquid petroleum gas was million barrels at four mined granite ca erns in Delaware County and one min shale cavern in Westmoreland County.

Natural gas processing plants in oper tion included absorption plants in E Venango, and Warren Counties with a t tal capacity of 16,500 gallons per day. combination drying and gasoline plant w also operated in Greene County produci about 1,000 gallons of product per day.

Peat.—Peat was produced at 12 oper tions in 7 counties and totaled 57,400 to with an average value of $11.86 per to Sales totaled 45,600 tons with an avera value of $11.56 per ton. Of total sales, percent was reported as humus, 36 perce as reed-sedge, and 3 percent as moss pea 83 percent was sold in bulk for $10.25 p ton and 17 percent was packaged for $18. per ton. Peat operations were conducted deposits involving a total of 1,110 acr with an average depth of 32 feet. Seventee shredders shredded 84 percent of the tot production. Wayne County was the leadi producing area, followed by Luzer County.

Petroleum and Natural Gas.—Crude production totaled 4.9 million barrels, a percent decrease from that of 1964. We head values of Pennsylvania crude fro the Bradford district was $4.48 per barr (same as 1964), from the Allegheny distri $4.40 per barrel, from the Middle distri $4.20 per barrel, and from the Southe district $3.93 per barrel. Productive wells at yearend totaled 52,731. There we 13 petroleum refineries in operation with crude-oil throughput capacity of 695,1 barrels per day and a cracking and refor ing capacity (gasoline output) of 252,7 barrels per day. According to the America Petroleum Institute, proved reserves crude oil at yearend totaled 76.8 millio barrels, a 9.9-million-barrel decrease fro yearend 1964.

Natural gas production totaled 84.4 b lion cubic feet, was marketed for $22.6 m lion. Productive gas wells at yearend t taled 17,516. According to the America Gas Association, proved natural gas r serves at yearend totaled 1,257 billion cub feet, a 13-billion-cubic-foot increase ov

arend 1964. Pennsylvania ranked second underground gas-storage capacities with storage capacity of 651 billion cubic feet. tural gas in underground storage at arend was 510 billion cubic feet, a 12 lion cubic-foot decrease from yearend 64.

According to the Oil and Gas Section, nnsylvania Bureau of Topographic and ologic Survey, 770 shallow-sand wells re drilled, of which 571 were drilled in- pendently of underground gas-storage d secondary-recovery projects, 198 wells secondary-recovery projects, and 1 well gas-storage. Of the 571 wells, 165 were s, 325 oil, and 81 dry holes. Two impor- nt significant discoveries were made in e Onondaga Chert-Oriskany Sandstone terval: One in Jackson Township, Cam- ia County, on the Laurel Hill Anticline roduction depth, 7,696–7,810 feet) and e in Young Township, Jefferson County, the Sabinsville Anticline (production pth, 7,094–7,193 feet). Of the 122 deep lls drilled, 82 were drilled in Erie and awford Counties. Of the 28 exploratory lls, all were deep test of which 5 were ccessful and 23 were dry. The Youngs- le-Sugar Grove field in Warren County ntinued to have the most activity with 8 new oil completions. The Tionesta- easantville area was the second most ac- e area with 73 oil wells and 5 dry holes illed. Seismic crews logged 65 crew-weeks, decrease of 35 percent from that of 1964. me gravity work was done in Crawford unty, and geological field parties were tive in several areas.

NONMETALS

Total production of portland cement 76-pound barrels) increased 4 percent d shipments increased 7 percent from at of 1964 while the average price de- eased $0.10 per barrel to $2.91. Total oduction of masonry cement (280-pound rrels) increased 9 percent and shipments creased 7 percent while the average price creased $0.04 per barrel to $2.66. Penn- lvania ranked second in the shipment of rtland cement in the United States and rst in the shipment of masonry cement.

Portland cement capacity was 51 million arrels, a decrease of 3 percent from that f 1964. Portland cement was produced at l plants during 1965. The leading county was Northampton with eight plants, followed by Lehigh County with four plants, Allegheny, Lawrence and Montgomery with two plants each, and Berks, Butler, and York with one plant each. Of the 5 plants, (11 kilns) in operation in western Pennsylvania, shipments of all types of portland cement totaled 10.4 million barrels at an average price of $3.18 per barrel, of which 89 percent was types I–II (general use and moderate heat) and 3 percent was type III (high-early-strength); 54 percent was consumed in western Pennsylvania, 37 percent in Ohio, 8 percent in West Virginia, and the remaining 1 percent in nine other States. Of 16 plants (72 kilns) in eastern Pennsylvania, shipments of all types of portland cement totaled 29.8 million barrels at an average price of $2.82 per barrel, of which 88 percent was types I–II, 6 percent type III, and 3 percent was white cement; 33 percent was consumed in eastern Pennsylvania, 29 percent in New Jersey, 15 percent in New York, 6 percent in Connecticut, 6 percent in Maryland, and the remaining 11 percent in 39 other States, District of Columbia, and several foreign countries.

Shipments of masonry cement from western Pennsylvania totaled 1.0 million barrels at an average price of $2.79 per barrel, of which 53 percent was consumed in western Pennsylvania, 39 percent in Ohio, and the remaining 8 percent in 6 other States. Shipments of masonry cement from eastern Pennsylvania totaled 2.0 million barrels at an average price of $2.59 per barrel, of which 24 percent was consumed in eastern Pennsylvania, 30 percent in New Jersey, 17 percent in New York, 7 percent in Virginia, 6 percent in Maryland, 5 percent in the District of Columbia, and the remaining 11 percent in 19 other States and several foreign countries.

Electrical energy used by the portland cement industry in western Pennsylvania totaled 251 million kilowatt-hours, all of which was purchased; eastern Pennsylvania used 741.6 million kilowatt-hours, of which 84 percent was purchased with the remaining 16 percent generated. Portland cement stocks at the end of the year totaled 1.5 million barrels in western Pennsylvania and 3.2 million barrels in eastern Pennsylvania.

Of the total portland cement shipments from western Pennsylvania, 62 percent

went to ready-mixed concrete companies, 14 percent to concrete product manufacturers, 13 percent to highway contractors, 7 percent to building material dealers, and the remaining 4 percent to miscellaneous customers and other contractors. Shipments from eastern Pennsylvania went to ready-mixed concrete companies (57 percent), concrete product manufacturers (23 percent), building material dealers (12 percent), highway contractors (7 percent) and the remaining 1 percent to other contractors and miscellaneous customers.

Cement rock and limestone were the chief raw materials consumed for the manufacture of portland cement, totaling 2.4 million tons for 83 percent of the total in western Pennsylvania and 8.5 million tons for 93 percent of the total in eastern Pennsylvania. Other raw materials used included shale, clay, sand, sandstone, slag, bauxite, gypsum, iron ore, slate, flue dust, and miscellaneous mill materials.

Air-entrained portland cement accounted for 59 percent of the production in western Pennsylvania and 19 percent in eastern Pennsylvania. Shipments from western Pennsylvania were by truck (94 percent), rail (5 percent), and boat (1 percent); shipments from eastern Pennsylvania were by truck (59 percent), and rail (41 percent). Bulk shipments accounted for 91 percent of the total in western Pennsylvania and 83 percent of the total in eastern Pennsylvania, with the balance packaged in containers.

Clays.—Total production of clays (excluding kaolin) increased 6 percent in tonnage and 12 percent in value from that of 1964. Fire clay accounted for 50 percent of the total production increasing 8 percent in tonnage and 15 percent in value over that of 1964. Miscellaneous clay and shale accounted for the remaining 50 percent of the total, increasing 5 percent in tonnage and 7 percent in value over that of 1964.

Lawrence County was the leading clay producer, but only 56 percent of the tonnage was fire clay. Clarfield County was the leading fire clay producer and (because of the high-grade plastic and flint clay commanding a premium price) led the State in total clay value. Berks County was the leading miscellaneous clay and shale producer. Of the total fire clay production, 48 percent was used for firebrick and block, 31 percent for building brick, 5 percent for vitrified sewer pipe, and the remaining 16 percent for high alumina brick, mortar, clay crucibles, foundries (bulk), other refractories, other heavy clay products, filler, absorbent uses, floor and wall tile, and other uses. Of the total miscellaneous clay and shale, 75 percent was used for building brick, 13 percent for cement, and the remaining 12 percent for lightweight aggregate, vitrified sewer pipe, foundries (bulk), pottery, floor and wall tile, filler, and other heavy clay products.

Kaolin was produced in Cumberland County for white cement and in Blair County for firebrick and block.

The Pennsylvania Geological Survey's new Bulletin M–51 on "Properties and Uses of Pennsylvania Shales and Clays" should stimulate further development of these resources.

Table 4.—Clays sold or used by producers, by kinds and uses [1]

(Short tons)

Use	Fire clay		Miscellaneous clay	
	1964	1965	1964	1965
Refractories:				
Firebrick and block	735,106	821,411	---	---
Fire clay and mortar	43,306	41,125	---	---
Heavy clay products	605,062	612,191	1,308,816	1,373,089
Portland and other hydraulic cements	---	---	198,358	221,122
Undistributed	[2] 200,639	[2] 232,492	[3] 95,813	[3] 92,792
Total	1,584,113	1,707,219	1,602,987	1,687,003

[1] Excludes kaolin.
[2] Includes exports, floor and wall tile, high-alumina brick, clay crucibles, foundries, steelworks (bulk), other refractories, insecticides and fungicides, other filler, absorbent uses, and other uses.
[3] Includes art pottery, flowerpots, and glaze slip; floor and wall tile (1965); foundries and steelworks (bulk); lightweight aggregate; and linoleum and oilcloth.

Table 5.—Clays sold or used by producers in 1965, by counties

County	Short tons	Value	Types of clay
Adams	80,400	$40,200	Miscellaneous clay.
Armstrong	303,096	1,537,293	Fire clay, miscellaneous clay.
Beaver	115,421	980,802	Fire clay, miscellaneous clay.
Bucks	62,000	62,000	Miscellaneous clay.
Chester	95,915	120,000	Miscellaneous clay.
Clarion	47,360	188,146	Fire clay, miscellaneous clay.
Clearfield	429,790	3,254,446	Do.
Clinton	34,280	98,041	Do.
Columbia	14,962	26,900	Miscellaneous clay.
Lawrence	523,335	656,390	Fire clay, miscellaneous clay.
Montgomery	57,470	97,470	Miscellaneous clay.
Somerset	114,726	870,633	Fire clay.
Undistributed [1]	1,515,467	9,764,572	
Total [2]	3,394,222	17,696,893	

[1] Includes Allegheny, Berks, Blair, Cambria, Centre, Cumberland, Dauphin, Fayette, Greene, Huntingdon, Indiana, Jefferson, Lancaster, Luzerne, McKean, Monroe, Northumberland, Schuylkill, and York Counties.
[2] Incomplete total; excludes kaolin produced in Blair and Cumberland Counties.

Gem Stones.—Mineral specimens were collected chiefly by hobbyists and amateur lapidarists at scattered locations throughout the State but mostly in Berks, Chester, Carbon, Lancaster, Lebanon, and Montgomery Counties.

Graphite.—Manufactured (artificial) graphite was produced in Elk County and further processed at Niagara Falls and sold to steel companies, foundries, and chemical companies in the form of graphite electrodes and anodes.

Gypsum.—A gypsum-calcining plant was operated at Philadelphia using both domestic and imported crude gypsum.

Iodine.—One company in Allegheny County and one company in Lebanon County consumed out-of-State crude iodine in the production of both inorganic and organic compounds.

Iron Oxide Pigments.—Crude iron oxide pigments were mined in the form of sulfur mud in Cambria County and extracted from the alumina processing of bauxite in the form of red iron oxide in Allegheny County. Finished iron oxide pigments were produced and shipped from two plants in Northampton County and one plant in Carbon County. Finished pigments included natural and manufactured black, brown, red, and yellow pigments, and mixtures of natural and manufactured red iron oxides.

Lime.—Production of lime (quicklime and hydrated lime) increased 9 percent in tonnage and value from that of 1964. Of the total lime production, 81 percent was quicklime and 19 percent hydrated. The average price per ton of quicklime increased from $13.73 in 1964 to $13.85 while hydrated lime decreased from $16.89 to $16.46. The chemical and other industrial markets consumed 75 percent of the lime production with the remaining 25 percent being distributed among refractory, agricultural, and construction markets. Eighteen plants were operated in 16 counties with Centre County ranking first in production with three large plants producing quicklime and hydrated lime accounting for 53 percent of the total lime tonnage and 47 percent of the total value. Of the 18 plants, 6 plants sold only quicklime, 4 plants sold only hydrated lime, and 8 plants sold quicklime and hydrated lime. Kilns in use included 17 rotary, 19 pot, and 16 shaft. Both batch and continuous hydrators were used for manufacture of hydrated lime. Regenerated quicklime was consumed at a pulp and paper plant in Blair County. Of the total lime sold, 65 percent was consumed in Pennsylvania, 8 percent in Maryland, 6 percent in New Jersey, 3 percent in Delaware, and the remaining 18 percent in 23 other States, District of Columbia, Canada, Chile, and Venezuela.

Mica.—Crude scrap mica was produced at a mine in York County. The quantity produced decreased slightly from that of 1964 but the value per ton increased. The processed mica was used in paint, rubber

Table 6.—Lime sold by producers, by counties

County	1964		1965	
	Short tons	Value	Short tons	Value
Armstrong	310	$4,371	340	$6,120
Centre	767,948	9,716,998	827,543	10,522,573
Dauphin	7,800	132,600	6,000	90,000
Lancaster	560	5,066	420	4,200
Lebanon	204,000	2,812,000	201,000	2,703,000
Mifflin	4,023	36,705	2,600	25,100
Northumberland	355	3,200	350	3,150
Other counties [1]	455,289	7,945,084	530,239	9,141,705
Total	1,440,285	20,656,024	1,568,492	22,495,848

[1] Includes Bedford, Butler, Chester, Columbia (1965), Juniata, Montgomery, Snyder, Westmor land, and York Counties.

(mold lubricant), welding rods, and textile coating.

Perlite (Expanded).—Crude perlite from out-of-State sources was expanded at two plants in Allegheny County and one plant each in Delaware, Lehigh, Montgomery, and York Counties. Lehigh County led in expanded perlite production. Production of expanded perlite was 13 percent less than that of 1964. The average price per ton of perlite sold or used increased 5 percent. The building plaster industry consumed the major portion of the expanded perlite production, with the remainder being used for loose fill insulation, concrete aggregate, soil conditioner, filler, filter aid, refractories, charbase, cryogenic applications, and other miscellaneous industrial uses.

Pyrites.—Pyrite concentrate was recovered by flotation in the milling process for magnetite iron ore in Berks and Lebanon Counties. The concentrate was then shipped to Sparrows Point, Md. for further processing.

Sand and Gravel.—Total sand and gravel production increased 14 percent in tonnage and 12 percent in value over that of 1964. Sand and gravel for building and paving purposes accounted for 86 percent of the total tonnage and increased 16 percent over that of 1964. Of total output, 50 percent was sand for construction (building, paving, fill, and other uses), 41 percent was gravel for construction (building, paving, railroad ballast, fill, and other uses), and 9 percent was unground sand for industrial (glass, molding, grinding and polishing, blast, fire or furnace, engine, and other uses). A small amount of ground sand was used for abrasives, chemicals, en amel, filler, glass, pottery, porcelain, til foundry and other uses, and a sma amount of Government-and-contracto processed gravel was produced for pavin purposes. The average price per ton fo the total sand and gravel production de creased from $1.63 in 1964 to $1.60 in 196 because sand and gravel for building an paving purposes, which had the lowe unit value of all types of sand and grave showed the greatest increase in output.

The leading producing county was Buck County followed by Erie, Beaver, Wes moreland, Luzerne, and Mercer Countie Company reports on 104 commercial opera tions in 45 counties show that 52 percen of the operations produced less tha 100,000 tons each for 11 percent of the to tal tonnage, 26 percent of the operation produced between 100,000 and 200,000 ton each for 21 percent of the total, 16 percen of the operations produced between 200,00 and 500,000 tons each for 29 percent of th total, 3 percent of the operations produce between 500,000 and 1,000,000 tons each fo 10 percent of the total, and 3 percent o the operations produced over 1,000,000 ton each for 29 percent of the total production.

Of total production, 97 percent was proc essed; 66 percent was trucked to market 28 percent by waterways, and 6 percent b railroads.

Sericite-Schist.—Crude sericite-schist wa produced from two mines in Adam County. Output decreased from that o 1964. After processing, sericite-schist wa used as a carrier in insecticide chemicals as a filler in asphaltic compounds, and in joint cement.

Table 7.—Sand and gravel sold or used by producers, by classes of operations, and uses

(Thousand short tons and thousand dollars)

Class of operation and use	1964		1965	
	Quantity	Value	Quantity	Value
Commercial operations:				
Sand:				
Molding	124	$396	234	$581
Building	4,697	6,648	5,566	7,575
Paving	2,859	4,109	3,374	4,902
Fire or furnace	108	326	140	406
Fill	24	25	42	43
Undistributed [1]	1,818	5,382	1,492	5,094
Total	9,630	16,886	10,848	18,601
Gravel:				
Building	3,137	4,550	3,522	4,987
Paving	2,978	4,507	3,418	5,241
Fill	207	138	321	200
Undistributed [2]	217	276	361	511
Total	6,539	9,471	7,622	10,939
Total sand and gravel	16,169	26,357	18,470	29,540
Government-and-contractor operations:				
Sand:				
Other	26	33	---	---
Gravel:				
Paving	---	---	32	66
Other	4	24	---	---
Total sand and gravel	30	57	32	66
All operations:				
Sand	9,656	16,919	10,848	18,601
Gravel	6,543	9,495	7,654	11,005
Grand total	16,199	26,414	18,502	29,606

[1] Includes glass, grinding and polishing, blast, engine, ground, and other sand.
[2] Includes railroad ballast, miscellaneous, and other gravel.

Stone.—Total production of stone increased 8 percent in tonnage and 9 percent in value from that of 1964. Increases in tonnage over those of 1964 were reported for limestone (9 percent), basalt (5 percent), and miscellaneous stone (17 percent). Decreases were reported for sandstone (10 percent), granite (3 percent), and slate (1 percent). Of the total tonnage, limestone accounted for 84 percent, basalt for 7 percent, sandstone for 5 percent, miscellaneous stone for 3 percent, and granite and slate for 1 percent. Almost all of the stone production was crushed and broken of which 55 percent was used for concrete aggregate and roadstone, 19 percent for cement manufacture, 11 percent for furnace flux, 5 percent for lime manufacture, 2 percent for agricultural, 1 percent for riprap, 1 percent for railroad ballast and the remaining 6 percent for other uses including limestone dust for coal mines, roofing granules, glass manufacture, and fillers.

Dimension stone accounted for less than one-half of 1 percent of the total tonnage, but more than 6 percent of the total value owing to the greater value per ton placed on such items as blackboards, structural and sanitary ware, flagstone, roofing slate, and building stone. Slate accounted for 35 percent of the dimension stone and 65 percent of its value with sandstone accounting for 45 percent of the tonnage and only 23 percent of the value. Stone was produced in 53 counties, 40 of which produced limestone. The leading stone producing county was Northampton, followed by Montgomery, Adams, Lancaster, and Berks. Limestones and dolomites, the most widely used mineral resources in Pennsylvania, next to coal, are featured in a new publication, "An Atlas of Pennsylvania's Mineral Resources, Part 1", released through the

Table 8.—Stone sold or used by producers, by uses

Use	1964		1965	
	Short tons	Value	Short tons	Value
Dimension stone:				
Building stone	121,921	$1,340,151	90,378	$1,334,311
Curbing and flagging	43,964	1,163,893	54,623	1,222,054
Other uses [1]	31,086	3,654,579	29,884	3,536,583
Total	196,971	6,158,623	174,885	6,092,948
Crushed and broken stone:				
Riprap	9,463	20,039	535,545	690,514
Concrete and roadstone	28,983,140	42,279,571	31,388,647	46,597,053
Furnace flux (limestone)	5,885,117	10,375,887	6,289,387	11,197,022
Railroad ballast	486,989	742,077	609,816	929,114
Agricultural	1,000,054	3,104,776	1,236,490	3,731,886
Other uses [2]	16,267,534	28,393,707	16,571,390	30,388,830
Total	52,632,297	84,916,057	56,631,275	93,534,419
Grand total	52,829,268	91,074,680	56,806,160	99,627,367

[1] Includes roofing slate and millstock.
[2] Includes refractory.

Pennsylvania Geological Survey in Harrisburg.

Sulfur.—Sulfur was recovered in Delaware County at one refinery using the Claus type process and at another refinery using single stage catalytic oxidation of hydrogen sulfide. Hydrogen sulfide was recovered by the Girdler System using diethanolamine and monethanolamine, and molten sulfur was recovered by the im

Table 9.—Stone sold or used by producers, by counties

County	1964		1965	
	Short tons	Value	Short tons	Value
Adams, Cumberland	4,137,126	$10,847,874	4,558,149	$11,516,082
Armstrong	185,813	431,532	326,222	688,284
Berks	3,396,066	4,578,911	3,535,373	4,917,995
Blair, Huntingdon	1,489,990	2,567,420	1,751,989	3,864,976
Bucks	3,160,124	4,223,338	3,367,985	4,614,913
Butler	1,289,182	2,467,851	1,479,334	2,836,027
Cambria	W	W	3,000	9,000
Carbon, Monroe, Schuylkill	928,550	2,364,168	846,089	2,222,169
Centre	2,432,183	4,259,858	2,803,809	4,798,857
Chester	2,449,119	5,073,218	2,665,405	5,671,473
Dauphin	988,084	1,616,504	1,094,256	1,736,573
Fayette, Somerset	935,980	1,832,068	1,156,916	2,454,028
Juniata, Mifflin, Snyder	888,606	1,249,631	660,840	936,057
Lancaster	2,948,392	4,181,751	3,599,565	5,273,131
Lawrence	3,199,749	4,345,289	3,322,735	4,653,231
Lebanon	1,698,035	2,867,643	1,778,070	3,051,168
Lehigh	2,533,795	2,624,085	2,640,717	2,810,401
Luzerne	W	W	498,952	832,222
Montgomery	4,679,418	7,671,742	4,844,640	7,899,248
Northampton	5,341,525	8,427,109	5,503,516	8,772,578
Northumberland	55,410	97,810	W	W
Susquehanna	170,896	745,587	267,364	906,985
Wayne	157,408	330,176	163,756	331,085
Westmoreland	667,021	1,167,469	756,458	1,330,625
York	3,074,191	6,617,425	3,442,201	7,130,166
Other counties [1]	6,022,605	10,486,221	5,738,819	10,370,093
Total	52,829,268	91,074,680	56,806,160	99,627,367

W Withheld to avoid disclosing individual company confidential data.
[1] Includes Allegheny, Bedford, Clarion, Clearfield, Clinton, Columbia, Delaware, Elk, Franklin, Fulton, Jefferson, Lycoming, McKean, Mercer, Montour, Perry, Potter, Tioga, Union, Washington, and Wyoming Counties, and counties indicated by symbol W.

proved Claus-type process at a refinery in Philadelphia County. Another refinery in Philadelphia County recovered sulfur by the Claus process. The quantity of sulfur produced was 14 percent less than in 1964.

Tripoli.—Total sales of tripoli (rottenstone) were about the same as in 1964. Two companies in Lycoming County mined and processed the material for use as an abrasive compound and as a filler material.

Vermiculite (Exfoliated).—Shipments of exfoliated vermiculite decreased 1 percent in tonnage but increased 5 percent in value from that of 1964. Two plants were in operation, one in Bucks County and one in Lawrence County. The largest use was for loose fill insulation. Other uses included a lightweight aggregate in concrete and plaster, horticulture, packing, and other miscellaneous uses.

METALS

Beryllium.—Besides beryllium metal, alloys, and compounds being produced by the Beryllium Corporation at Reading, the company announced the manufacture of beryllium sheets rolled directly from cast ingots. Intermediate steps in the powder metallurgy process used to make conventional hot pressed sheets are eliminated. The sheets are reported to have more than average ductility and can be fabricated with the same equipment and at the same temperature (500 to 700° F) as magnesium alloys.

Cadmium.—Shipments of cadmium (primary and secondary metal from processing plants) decreased considerably from 1964. Cadmium was recovered by St. Joseph Lead Co. at its Josephtown plant in Beaver County and by New Jersey Zinc Co. at its Palmerton plant in Carbon County.

Cobalt.—Cobalt content in shipments of pyrite concentrate from magnetite iron ore mines in Berks and Lebanon Counties increased slightly over that of 1964.

Columbium.—Kawecki Chemical Co., Boyertown, Berks County, entered into licensing agreement with Imperial Chemical Industries, Ltd., for exclusive manufacture and marketing in the United States of a high-strength columbium alloy which is expected to have applications in aerospace industries. The metal can stand temperatures up to 2,500° F. It can be easily fabricated into thin sheets and wire and be recrystallized after coldworking without loss of ductility. Welding properties are reported excellent. Composition of the alloy is 11 percent tungsten, 3 percent molybdenum, 2 percent hafnium, 0.08 percent carbon, and the remainder columbium.

Copper, Gold, and Silver.—Copper concentrate was recovered by flotation of magnetite iron ore mined in Lebanon County and shipped to western refineries for processing. The concentrate also contained gold and silver.

Ferroalloys.—Production of ferroalloys increased 19 percent above that of 1964 and totaled 697,000 tons. Shipments also were greater and amounted to 708,000 tons valued at $125.3 million. Of the 12 types of ferroalloys produced in the State, ferromanganese was the most predominant. Other significant ferroalloys produced included ferromolybdenum and spiegeleisen.

Iron Ore.—Production and shipments of iron ore (usable) was slightly lower in quantity but slightly higher in value compared with that of 1964. Shipments were in the form of pellets processed from pulverized magnetite concentrated by magnetitic separation at agglomerating plants at mines in Berks and Lebanon Counties. Crude magnetite was mined underground by block-caving methods. Most of the iron-ore pellet production was shipped to company-owned iron and steel plants in Pennsylvania and Maryland for consumption in blast furnaces.

Iron and Steel.—Pig iron production totaled 21.8 million tons, a 4-percent increase over that of 1964. Of the pig iron output, 91 percent was basic, 6 percent Bessemer, and the remaining 3 percent malleable, low phosphorus, foundry, and direct castings.

Receipts of iron ore totaled 27.8 million tons, 62 percent from foreign countries and 38 percent from domestic production. Consumption of iron ore totaled 27.6 million tons, 49 percent by agglomerating plants, 46 percent by blast furnaces, and 5 percent by steel furnaces. Iron ore stocks at beginning and end of year were 11.3 million tons and 10.6 million tons, respectively. Fluxes consumed by the iron and steel in-

dustry included 3.4 million tons of limestone, 3.1 million tons of dolomite, and 1.1 million tons of other type fluxes. Other materials consumed included 1.3 million tons of mill cinder and roll scale, 1.0 million tons of raw flue dust, 1.6 million tons of steel furnace slag, 14.9 million tons of net coke, 0.35 million tons of coke breeze, and 0.36 million tons of anthracite. Steel furnaces consumed 20.6 million tons of pig iron and hot metal, 11.0 million tons of home and purchased scrap, and 234,000 tons of slag scrap. Blast furnaces consumed 947,000 tons of home and purchased scrap, 193,000 tons of slag scrap, and 60,000 tons of pig iron and hot metal.

Agglomerates consumed in blast furnaces totaled 20.5 million tons, of which 66 percent was United States sinter (regular), 18 percent iron ore pellets (regular), and the remaining 16 percent semi-and-self-fluxing sinter, foreign iron ore, and other agglomerates. Agglomerates consumed in steel furnaces totaled 723,600 tons, of which most were U.S. sinter (regular) and iron ore pellets (regular). Slag produced at blast furnaces totaled 7.2 million tons, scrap produced 165,000 tons, and flue dust recovered 993,000 tons.

Nine companies operated 20 plants, the same number as in 1964. Fifty-four blast furnaces were operated at sometime during the year, compared with 58 blast furnaces in 1964.

According to the American Iron and Steel Institute, steel production (ingots and steel for castings) totaled 32.0 million tons, a 5-percent increase over that of 1964. Of the total steel production, 24.2 million tons were from open hearth and bessemer, 4.7 million tons from basic oxygen process, and 3.1 million tons from electric furnaces. Production of hot-rolled steel products totaled 23.8 million tons; merchant bars and light shapes, 3.0 million tons; concrete reinforcing bars, 853,000 tons; wire rods, 912,000 tons; and blanks, tube rounds, or pierced billets for seamless tubing, 1.8 million tons.

Smelters.—Zinc concentrates were shipped to smelters at Josephtown in Beaver County and at Palmerton in Carbon County. Zinc concentrates shipped to the Josephtown smelter came from New York, Missouri, Alabama, Peru, Argentina, and Canada. Zinc concentrates and crude ore shipped to the Palmerton smelter came from Pennsylvania, New Jersey, Virginia, Tennessee, Indiana, Colorado, and various suppliers of foreign origin zinc ores. Products from the Josephtown smelter included zinc metal, lead-free zinc oxide, cadmium metal, and sulfuric acid, which were used in such consumer items as galvanized ware, die castings and brass in the case of zinc; paint, rubber, ceramics, and pharmaceuticals in the case of zinc oxide; and protective coatings, bearings, and atomic uses in the case of cadmium. Products from the Palmerton smelter include slab zinc, zinc base die casting alloys, zinc oxide, rolled zinc, dry-battery shells, cadmium, and spiegeleisen.

The Josephtown smelter established a new production record for the second consecutive year, producing 202,657 tons of zinc metal equivalent for the year, compared with 193,444 tons in 1964.

Zinc.—Production of zinc ore (based on the recoverable zinc metal tonnage and value as metal established after transportation, smelting, and manufacturing charges have been added to the value of the ore at the mine) decreased 10 percent in tonnage and 4 percent in value from that of 1964. The zinc ore was concentrated at the mine in Lehigh County and the concentrates were shipped to the company's smelter in Carbon County.

REVIEW BY COUNTIES

Adams.—Crushed limestone was produced for blast-and-open heartlh furnace flux, concrete aggregate, roadstone, railroad ballast, and agricultural purposes by Bethlehem Mines Corp. near Hanover. Gettysburg Limestone Products, Inc., near Fairfield, and Teeter Stone, Inc., near Gettysburg, produced limestone for concrete aggregate and roadstone. The Ruberoid Co. produced crushed basalt at its Greenstone quarry and quartzite at its Greystone quarry, principally for roofing granules near Charmain. The Bethlehem Steel Corp. plans to build a second 600-ton-per-day lime plant to serve its oxygen steelmaking furnaces. The new installation will be lo-

ated at the Hanover limestone quarry. Its utput will be shipped by rail to steelmak- ng plants. The new plant will handle ap- roximately 1,200 tons of limestone a day. Alwine Brick Co. mined miscellaneous clay t New Oxford for manufacturing building rick. Sericite schist was produced at two pen pit mines near Mt. Hope and Ben- lersville by Summit Industries, Inc. The rude material was trucked to the company ill at Aspers. After grinding, the material vas shipped for consumption as asphalt iller, insecticides, and joint cement.

Alegheny.—Bituminous coal was pro- luced at 35 operations; 14 underground, 19 trip, and 2 auger. Production totaled 5.0 nillion tons, a 3-percent increase over that of 1964. Underground production totaled 3.9 million tons, 3.3 million tons of which vas not sold on the open market. Of the 4 underground operations, 10 loaded coal nechanically; 17 continuous miners with 4 mobile loaders produced 3.2 million ons, 18 mobile loaders produced 0.73 mil- ion tons, and 2 duckbills produced 6,000 ons. Fifteen cutting machines cut 0.75 mil- ion tons. Strip mines reported 25 power hovels, 9 draglines, 22 bulldozers, 12 ower drills, and 32 trucks. Auger mines eported two augers, three power shovels, wo bulldozers, two power drills, and three rucks. Five preparation plants prepared 3.8 million tons of clean coal, 3.1 million ons of which was mined underground. Coal crushed totaled 3.6 million tons and coal treated totaled 2.1 million tons.

Portland and masonry cements were pro- duced by Universal Atlas Cement Division, United States Steel Corp., at Universal, and by Green Bag Cement Co., Division of Marquette Cement Manufacturing Co., near Pittsburgh. Most of the portland ce- ment produced was of the general use and moderate heat type, but some high-early-strength type was also produced. Portland cement output was almost evenly divided between air-entrained and non-air-en- trained. Some slag was used to produce portland slag. Most of the portland cement was shipped in bulk by truck in western Pennsylvania. Primary customers were ready-mixed concrete companies. A new 12,000-barrel bulk cement distribution sta- tion was built at Creighton by the Colum- bia Cement Corp., a subsidiary of the Pittsburgh Plate Glass Co. The Marquette Cement Co. instituted a rebuilding pro- gram at its Neville Island plant near Pitts- burgh. Along with an annual clinker pro- duction capacity of more than 1.7 million barrels, about twice that of the old plant, the new plant incorporates maximum feasi- ble automation and impressive physical features that far transcend the capabilities of its predecessor in terms of efficiency and output.[2]

Shale was produced by Milliken Brick Co., Inc., near Wilkinsburg for manufac- turing Building bricks at its Wilkinsburg and Pitcairn plants. Clay was produced by Glassmre Brick and Tile Co. near Creigh- ton for manufacturing bricks. Sand and gravel for paving purposes and fill and in- dustrial sand for molding uses was pro- duced by McCrady, Inc., near Harmarville. Burrell Construction and Supply Co. pro- duced sand for paving purposes near Na- trona Heights. Sidwell Loam Sand Co. pro- duced molding sand near Pittsburgh. Dimension sandstone for construction pur- poses was produced by Malli Mines in Jefferson Borough. The Allegheny Ludlum Steel Corp. purchased all surface properties of Pennsalt Chemicals Corp. in January, and continued the recovery of crude red iron oxide pigments from the red mud resi- due resulting from the extraction of alu- mina from bauxite at Natrona. Expanded perlite, mainly for use in lightweight plas- ter and concrete, was produced by Panaca- lite Perlite Co., Pittsburgh; and Perlite Manufacturing Co., Carnegie. Clover Chemical Co. reported an increase in the production of organic and inorganic iodine compounds from out-of-State crude iodine at a plant near Pittsburgh.

Armstrong.—Bituminous coal was pro- duced at 92 operations; 42 underground, 39 strip, and 11 auger. Production totaled 4.8 million tons, an 11-percent increase over that of 1964; 3.3 million tons from under- ground, 1.4 million tons from strip, and 0.1 million tons from auger. Most of the pro- duction, 4.5 million tons, was sold in the open market for an average price of $3.98 per ton. Of the underground production, almost all of the tonnage was loaded me- chanically by 16 continuous miners and 37 mobile loaders at 26 operations. Fifty-five cutting machines cut 2.3 million tons. Strip mines had 54 power shovels, 19 draglines,

[2] Pit and Quarry. V. 58, No. 1, July 1965, pp. 168–183.

Table 10.—Value of mineral production in Pennsylvania by counties [1]

County	1964	1965	Minerals produced in 1965 in order of value [2]
Adams	W	W	Stone, sericite schist, clays.
Allegheny [3]	$27,192,462	$28,042,471	Coal, cement, clays, sand and gravel, stone, iron ore (pigment material).
Armstrong	21,465,940	22,687,658	Coal, clays, sand and gravel, lime.
Beaver	3,784,588	4,449,172	Sand and gravel, coal, clays.
Bedford	W	W	Stone, coal, sand and gravel, lime.
Berks	W	W	Iron ore, cement, stone, clays, coal, cobalt, pyrites.
Blair	1,924,474	2,180,478	Stone, clays, coal, sand and gravel.
Bradford	341,185	389,510	Sand and gravel, coal.
Bucks	W	W	Sand and gravel, stone, clays.
Butler [4]	9,445,729	11,218,902	Coal, cement, stone, lime, sand and gravel.
Cambria	48,488,015	51,336,952	Coal, clays, sand and gravel, stone, iron ore (pigment material).
Cameron	W	W	Coal.
Carbon	5,906,595	4,624,670	Coal, stone, sand and gravel.
Centre	W	W	Lime, stone, coal, clays.
Chester [5]	5,194,718	5,791,473	Stone, lime, clays.
Clarion	12,329,169	12,993,341	Coal, stone, sand and gravel, clays.
Clearfield	W	29,679,981	Coal, clays, sand and gravel, stone.
Clinton	W	W	Coal, stone, clays.
Columbia	W	W	Coal, sand and gravel, lime, clays, peat, stone.
Crawford	108,000	308,000	Sand and gravel.
Cumberland	W	W	Stone, sand and gravel, clays.
Dauphin	W	3,591,208	Stone, coal, clays, sand and gravel.
Delaware	W	W	Stone.
Elk	W	W	Coal, stone.
Erie	W	W	Sand and gravel, peat.
Fayette	12,824,818	10,640,146	Coal, clays, stone, sand and gravel.
Forest	W	W	Sand and gravel.
Franklin	1,534,184	1,402,981	Stone, sand and gravel.
Fulton	W	W	Do.
Greene	71,621,786	W	Coal, clays.
Huntingdon	W	5,578,588	Sand and gravel, stone, coal, clays.
Indiana	W	W	Coal, clays.
Jefferson	W	8,400,759	Coal, clays, stone.
Juniata	W	W	Stone, lime.
Lackawanna	W	W	Coal, sand and gravel, peat.
Lancaster	6,856,245	7,926,777	Stone, coal, clays, sand and gravel, lime.
Lawrence	[3] 7,792,359	W	Cement, stone, coal, clays, sand and gravel, peat.
Lebanon	W	22,776,493	Iron ore, copper, stone, lime, cobalt, coal, pyrites, gold and silver.
Lehigh	[6] 26,997,146	[3] 10,824,551	Cement, zinc, stone.
Luzerne	58,439,697	W	Coal, sand and gravel, stone, peat, clays.
Lycoming	W	2,083,702	Stone, sand and gravel, coal, tripoli.
McKean	W	392,657	Clays, stone, coal, sand and gravel.
Mercer	W	W	Coal, sand and gravel, stone.
Mifflin	W	W	Sand and gravel, stone, lime.
Monroe	535,407	655,616	Stone, sand and gravel, clays, peat.
Montgomery	[4] 7,787,028	W	Stone, cement, lime, clays, sand and gravel.
Montour	W	W	Stone, sand and gravel.
Northampton	62,486,684	60,458,181	Cement, stone, sand and gravel.
Northumberland	W	12,458,825	Coal, clays, stone, lime.
Perry	W	W	Stone.
Philadelphia	W	W	Sand and gravel.
Potter	W	W	Stone.
Schuylkill	W	43,796,225	Coal, stone, sand and gravel, clays.
Snyder	431,676	455,499	Stone, sand and gravel, coal, lime.
Somerset	15,682,072	18,054,987	Coal, clays, stone, sand and gravel.
Sullivan	82,377	127,095	Coal.
Susquehanna	745,587	927,083	Stone, coal.
Tioga	1,603,429	1,764,081	Coal, sand and gravel, stone.
Union	W	W	Stone.
Venango	W	W	Coal, sand and gravel.
Warren	412,000	470,000	Sand and gravel.
Washington	W	W	Coal, stone.
Wayne	W	713,085	Stone, sand and gravel, peat.
Westmoreland	W	W	Coal, sand and gravel, stone, lime.

See footnotes at end of table.

Table 10.—Value of mineral production in Pennsylvania by counties [1]—Continued

County	1964	1965	Minerals produced in 1965 in order of value [2]
Wyoming	$593,267	$758,817	Sand and gravel, stone.
York [4]	7,421,637	7,986,401	Cement, stone, lime, clays, sand and gravel, mica.
Undistributed [7]	482,021,681	517,876,635	
Total	902,050,000	913,823,000	

W Withheld to avoid disclosing company confidential data.
[1] Pike County is not listed because no production was reported.
[2] Excludes value of natural gas, natural gasoline, LP gases, petroleum, and gem stones unspecified by counties; included with "Undistributed."
[3] Excludes cement; included with "Undistributed."
[4] Excludes cement and lime; included with "Undistributed."
[5] Excludes lime; included with "Undistributed."
[6] Excludes masonry cement; included with "Undistributed."
[7] Includes values indicated by symbol W.

5 bulldozers, 2 carry-all scrapers, 10 power drills, and 121 trucks. Auger mines reported 12 augers, 6 bulldozers, 1 power drill, and 10 trucks. Seven preparation plants prepared 2.5 million tons of coal, most of which was produced from underground mines. Coal crushed totaled 1.9 million tons, and coal treated totaled 0.12 million tons.

Eight clay companies operated six underground and two opencut mines. Freeport Brick Co., operating an underground mine near Freeport, was the leading producer, followed by Howmet Corp. with an underground mine near Kittanning. Output of clay increased 18 percent over that of 1964, and most of it was used for firebrick and block. Sand and gravel produced at four operations was primarily used for building and paving purposes. Output increased 52 percent over that of 1964. The leading producers were Glacial Sand and Gravel Co. near Tarrtown and Manorville Sand Co. near Manorville. Output of crushed limestone increased considerably from last year and was chiefly used for concrete aggregate and roadstone. Of the five producers, Manor Minerals, Inc., near Kittanning reported the largest output, followed by Black Limestone Co. near West Franklin, and Mowry & Good near McWilliams in West Franklin Township. Black Limestone Co. reported production for the first time. C. D. McCanna reported hydrated agricultural lime production at a plant near Kittanning.

Beaver.—Building activity continued the upward trend as was apparent in the large increase in building sand and gravel, which accounted for almost four-fifths of the sand and gravel output. Most of the balance was consumed as paving aggregate. Of the six sand and gravel operations, Shippingport Sand & Gravel Co. at Georgetown and Shippingport, and Dravo Corp., Keystone Division at Vanport, were the leading producers. Four clay pits and three underground clay mines produced mostly fire clay for building brick manufacture. Leading producers were Standard Clay Manufacturing Co. at New Brighton and Colonial Clay Products Co. at Fallston.

Bituminous coal was produced at 18 operations; 2 underground, 14 strip, and 2 auger. Production totaled 424,000 tons, a 14-percent decrease from that of 1964. Strip mines accounted for 71 percent of the production with 20 power shovels, 10 draglines, 19 bulldozers, 2 power drills, and 23 trucks. Underground operations reported one mobile loader loading into shuttle cars, two hand-loaded face conveyors, and three cutting machines. Auger mines reported the use of two augers, one bulldozer, and five trucks. No preparation plants were reported in operation but 3,300 tons was crushed at loading tipples.

Bedford.—Crushed limestone and sandstone output decreased from that of 1964, but increased 5 percent in value, owing principally to the increase in the average value per ton of crushed sandstone. The Detwilers Industries, Inc., produced crushed sandstone for concrete aggregate and roadstone near New Enterprise. New Enterprise Stone & Lime Co. produced crushed limestone for concrete aggregate, coal mine rock dust, and hydrated lime at

its Ashcom quarry near Everett. Bituminous coal was produced at 12 operations, 9 underground and 3 strip. Production totaled 317,000 tons, 11-percent more than in 1964. All the underground production was shipped by truck and all was sold on the open market for an average value of $3.17 a ton; one continuous miner and three hand-loaded face conveyors loaded coal mechanically, one cutting machine was in operation, and 22,800 tons was shot from the solid or cut by hand. Strip mines reported four power shovels, two draglines, three bulldozers, two power drills, and seven trucks. No preparation plants were reported in operation but some coal was crushed at loading tipples.

Berks.—Bethlehem Mines Corp. mined crude magnetite at its Grace mine near Morgantown. A concentrating plant at the mine processed the iron ore by crushing and grinding and magnetically separating and pelletizing the fine-sized material. Pyrites (containing cobalt and copper) recovered by flotation were shipped to the company's plant at Sparrows Point, Md. for processing. Allentown Portland Cement Co. produced portland and masonry cements, most of which was non-air-entrained, general use and moderate-heat-type portland cement. Stone output increased 4 percent over that of 1964. Crushed limestone was the principal type of stone produced and accounted for more than 70 percent of the total stone output, followed by crushed basalt and sandstone. Allentown Portland Cement Co. with quarries near Evansville and Oley produced crushed limestone and cement rock for cement manufacture. Other large crushed limestone producers included Eastern Industries, Inc., with quarries at Kutztown and Oley; Berks Products Co. at South Temple; and E. J. Breneman, Inc., at Sinking Spring. Crushed basalt was produced by The John T. Dyer Quarry Co. at Birdsboro; Bradford Hills Quarry, Inc., at Morgantown; and Pottstown Trap Rock Quarries at Douglassville, mostly for concrete aggregate, roadstone, and railroad ballast. Glen-Gery Shale Brick Corp. reported a slight increase in their production of shale at opencut mines near Shoemakersville and Wyomissing for the manufacture of building brick. Anthracite production was reported at a lower rate than that of 1964.

Blair.—Stone output increased 17 percent over that of 1964 owing chiefly to the increased demand for crushed limestone, concrete aggregate, and roadstone. Eight companies operated nine limestone quarries near Roaring Spring, Canoe Creek, Tyrone, Hollidaysburg, Altoona, Claysburg, Royer, and Duncansville. Quartzite was crushed for ganister (silica brick) near Hollidaysburg and Sproul, and for railroad ballast near Williamsburg. Plastic fire clay and kaolin were produced at separate operations near Williamsburg for use in making firebrick and block. Sand for building purposes was produced by Frankstown Sand Supply, near Frankstown. West Virginia Pulp & Paper Co. produced regenerated quicklime in secondary recovery operations for use in the manufacture of paper at its Tyrone plant. Bituminous coal was produced at only two small underground operations compared to four underground and one strip operation in 1964. Production totaled 5,500 tons, all shot from the solid or cut by hand.

Bradford.—Sand and gravel was produced at two operations near Towanda; State Aggregates, Inc., and Towanda Sand & Gravel Co., Inc. Most of the output was used for paving purposes, but some was also used for building, fill, ready-mixed concrete, and antiskid highway protection. Bituminous coal was produced at only one strip mine on Sand Run.

Bucks.—The county continued to be the leading sand and gravel producing area with operations near Tullytown, Upper Black Eddy, New Hope, and Levittown. Most of the production was used for building and paving purposes. A. L. Lewis, Inc., is building a new modern sand and gravel preparation plant near Uhlerstown. Limestone was the leading type of stone produced, followed by miscellaneous stone, basalt, and sandstone. Total stone output was slightly higher than that of 1964. Eureka Stone Quarry, Inc., near Eureka, was the leading limestone producer with all of its output used for concrete aggregate and roadstone. Miscellaneous stone (argillite) was quarried by Better Material Corp., near Penns Park and Gill Quarries, Inc., near Trevose, for use in concrete aggregate and roadstone.

Seven basalt quarries were in operation. The largest operations were The General Crushed Stone Co. near Quakertown;

ohickon Quarry Co. near Weisel; and ucks County Crushed Stone, Inc., near ttsville. Virtually all of the output was ed for concrete aggregate and roadstone. rushed bluestone was produced at Wiley's uarry near Point Pleasant and used for ncrete aggregate and roadstone. Dimen- on sandstone was produced at a quarry ong the Delaware River near Lumber- lle. Quakertown Brick & Tile Co., Inc., ined shale near Quakertown for manu- cturing building brick. Hyzer & Lewellen oduced exfoliated vermiculite at South- mpton for use in home insulation, light- eight aggregate, and miscellaneous items.

Butler.—Bituminous coal was produced 69 operations; 12 underground, 45 strip, d 12 auger. Production totaled 2.2 mil- on tons, a 22-percent increase over that of 64. Underground production totaled 3,000 tons, and averaged $4.08 per ton in lue, cut by 21 cutting machines, and 87 rcent mechanically loaded by 5 mobile aders and 3 hand-loaded face conveyors. rip mines produced 1.6 million tons with power shovels, 37 draglines, 3 carry-all rapers, 67 bulldozers, 27 power drills, and 7 trucks, and averaged $3.58 per ton in lue. Auger production totaled 177,000 ns with 16 augers, 2 power shovels, 7 ulldozers, and 16 trucks at an average of .67 per ton in value. Five preparation ants prepared 441,000 tons of clean coal. fteen mine tipples crushed 1.1 million ns, and two plants treated 55,000 tons ith calcium chloride and oil.

The Penn-Dixie Cement Corp. utilized mestone, cement rock, and sand produced om their own operations at West Vinfield for manufacturing portland and asonry cements. Most of the portland ce- ent was of the general use and moder- e-heat-type but some high-early-strength as also produced, both air-entrained and on-air-entrained. Cement was shipped rincipally in bulk by truck, chiefly in the estern Pennsylvania area. Output of lime- one increased 15 percent over that of 964. Most of the production was used for ncrete aggregate and roadstone, with a zable amount also used for cement manu- cture. The largest producers were the enn-Dixie Cement Corp. at West Winfield nd Allegheny Mineral Corp. near Harris- lle. Dimension sandstone for architectural ork was produced near Boyers. Mercer ime & Stone Co. produced mostly quick- lime near Branchton for consumption in steel furnaces. Output of sand and gravel decreased 32 percent from that of 1964. Building and paving sand and gravel was the greatest quantity produced near Slip- pery Rock, with a small amount of sand produced by Penn-Dixie Cement Corp. for their cement operation at West Winfield.

Cambria.—Bituminous coal was produced at 97 operations; 75 underground, 20 strip, and 2 auger. Production totaled 8.9 million tons, a 2-percent increase over that of 1964. Underground mines produced 7.9 million tons, 7.8 million tons of which was loaded mechanically at 32 mines with 91 contin- uous miners, 17 mobile loaders (of which 4 were used with continuous miners), and 29 hand-loaded face conveyors. Seventy-four cutting machines cut 1.0 million tons. Strip mines reported 33 power shovels, 15 drag- lines, 34 bulldozers, 11 power drills, and 59 trucks. Auger mines reported three augers, one bulldozer, and two trucks. Eleven preparation plants prepared 6.8 million tons of clean coal, most of which was mined underground. Twenty-three mine tipples crushed 5.1 million tons, and eight plants treated 319,000 tons.

Plastic fire clay was used to manufacture firebrick and block by Harbison-Walker Refractories Co. near Blandburg. Triangle Clay Products Co. produced miscellaneous clay for building brick near Johnstown. Flint fire clay was mined by the Buck Hill Coal Co. near Patton for the manufacture of vitrified sewer pipe. Sand and stone grav- el was crushed from a standstone deposit near Menoker Heights, south of John- stown, for building and fill purposes. Crushed sandstone was produced by Sa- muel Nicosia near Johnstown for the manufacture of silica brick and for con- crete aggregate and roadstone. Lanzen- dorfer Minerals Co. produced sulfur mud for yellow iron oxide pigments at an operation near Twin Rocks.

Cameron.—Bituminous coal was pro- duced at one strip mine near Sterling Run having one power shovel, one dragline, one bulldozer, and two trucks.

Carbon.—Anthracite production con- tinued its downward trend as it decreased 17 percent in tonnage and 24 percent in value from that of 1964. North American Refractories Co. produced crushed quartz- ite at its Little Gap quarry near Palmerton

for silica brick. Fauzio Bros. produced crushed sandstone at its Red Rock quarry near Nesquehoning for concrete aggregate and roadstone. Sand for building and paving purposes and for cement manufacture was produced by the Alliance Sand Co., Division of Martin Marietta Corp. at a stationary plant near Palmerton. Building sand and gravel was produced by Wagner Sand Co. near Weatherly. Production of finished natural black, brown, red, and yellow pigments, and manufactured brown and red pigments was reported by The Prince Manufacturing Co. near Bowmanstown.

Centre.—The county continued as the leading lime-producing area. Most of the production was high-calcium quicklime for chemical and other industrial uses, chiefly for steel furnaces and paper and pulp mills. Producers were Warner Co. and National Gypsum Co. near Bellefonte, and Standard Lime & Refractories Co., Division of Martin Marietta Corp. near Pleasant Gap. Smaller quantities of hydrated lime for construction, agriculture, chemical, and other industrial purposes was also produced. Crushed limestone was produced and used in lime manufacture by the companies already mentioned. A significant amount was also produced and used for concrete aggregate and roadstone by Appalachian Stone Division, Martin Marietta Corp. near Pleasant Gap, Neidigh Bros. Limestone Co., Inc., near State College, Nittany Materials, Inc., in Marion Township, and Black Hawk Quarries near Centre Hall. Harbison-Walker Refractories Co. produced plastic fire clay near Stormstown for manufacturing firebrick and block.

Bituminous coal was produced at 23 operations; 8 underground, 13 strip, and 2 auger. Production totaled 622,000 tons, a 3-percent increase over that of 1964. Strip mines accounted for 84 percent of the total tonnage and reported 20 power shovels, 10 draglines, 16 bulldozers, 10 power drills, and 50 trucks. Three of the eight underground operations loaded coal mechanically with one mobile loader and two hand-loaded face conveyors. Seven cutting machines were also in use. Auger mines reported three augers and four trucks in use. Two preparation plants prepared 274,000 tons of clean coal, most of which came from strip mines. Four mine tipple reported 343,000 tons crushed and one tipple treated a small amount of coal with oil.

Chester.—Most of the stone production was crushed limestone for concrete aggregate and roadstone, but some was also used for blast furnace flux, lime manufacture, and magnesium metal manufacture. Producers included Bradford Hills Quary Inc., near Downington, and Appalachian Stone Division, Martin Marietta Corp. near Malvern. Crushed basalt, chiefly for concrete aggregate and roadstone, was reported by V. Di Francesco & Sons near Devault and Keystone Trappe Rock Co. near Glen Moore. Dimension basalt, rough and dressed, for building stone and flagging was produced by French Creek Granite Co. near St. Peters. Operations in Avendale, Malvern, and New Garden Township reported production of dimension sandstone for construction, curbing, and flagging purposes. Warner Co. produced high-magnesium lime at its Cedar Hollow plant near Devault, mostly for sewage and trade wastes treatment. McAvoy Vitrified Brick Co. continued to mine miscellaneous clay and shale near Phoenixville for building brick manufacture.

Clarion.—Bituminous coal was produced at 81 operations; 7 underground, 70 strip, and 4 auger. Production totaled 3.2 million tons, a 2-percent increase over that of 1964. Strip mines accounted for 3.1 million tons and reported 61 power shovels, 34 dragglines, 53 bulldozers, 14 power drills, and 109 trucks. Four of the seven underground mines loaded coal mechanically with two continuous miners loading onto conveyors and two hand-loaded face conveyors. Five cutting machines cut 13,000 tons. Auger mines reported four augers, three bulldozers, one drill, and four trucks. Six preparation plants prepared 2.4 million tons of clean coal, 2.3 million tons of which was strip coal. Ten mine tipples crushed 2.8 million tons of coal, and three plants treated 135,000 tons with calcium chloride or oil. Production of crushed limestone for concrete aggregate and roadstone near Parker and Turkey City increased considerably from last year. Some crushed limestone for cement manufacture and agricultural purposes was also produced at the Parker operation.

Sand and gravel, mostly for paving purposes, was reported by Glacial Sand & Gravel Co. from a stationary plant near Parker. Plastic and flint fire clay was mined underground by the Climax Division of A. P. Green Fire Brick Co. near Climax for its own use in producing firebrick and block. Plastic fire clay was produced from several strip pits near Corsica by W. P. Stahlman Coal Co., Inc., for the manufacture of clay crucibles. Shale was produced by New Bethlehem Tile Co. near New Bethlehem for the manufacture of building brick and other heavy clay products. Frank P. Pope Co. near New Bethlehem produced plastic fire clay for refractory mortar.

Clearfield.—Bituminous coal was produced at 143 oprations; 51 underground, 83 strip, and 9 auger. Production totaled 27.0 million tons, a 4-percent decrease from that of 1964. Strip mines accounted for 5.8 million tons and reported 149 power shovels, 89 draglines, 143 bulldozers, 59 power drills, and 339 trucks. Of the 51 underground mines, 20 loaded 863,000 tons of coal mechanically with 9 continuous miners, 4 mobile loaders, 1 duckbill, and 31 hand-loaded face conveyors. Sixty-six cutting machines cut 558,000 tons. Auger mines reported 10 augers, 1 power shovel, 3 bulldozers, 5 power drills, and 15 trucks. Ten preparation plants prepared 3.2 million tons of clean coal, 1.9 million tons of which was strip coal and 1.2 million tons was underground coal thirty-four mine tipples crushed 3.6 million tons and seven plants treated 31,000 tons with oil or calcium chloride.

The Harbison-Walker Refractories Co. consumed both purchased fire clay and fire clay of its own production from their various mines throughout the county mostly for manufacturing firebrick and block. Other major reporting companies were Falls Creek Refractories Co., Blair Clay Products, Inc., and Clearfield Clay Products Co., all near Curwensville; Williamsgrove Clay Products Co. near Bigler; and Bartell Excavating, Inc., and Hiram Swank's Sons, Inc., both near Boardman. Almost all of the clay mined in the county was fire clay, most of which was for firebrick and block. Gravel produced near Curwensville and crushed limestone quarried near Clearfield by Appalachian Stone Division, Martin Marietta Corp., was used as fill for dam construction.

Clinton.—Bituminous coal was produced at nine operations, one underground and eight strip. Production totaled 555,000 tons, a 15-percent increase over that of 1964. Strip mines accounted for most of the tonnage and reported 10 power shovels, 4 draglines, 11 bulldozers, 3 power drills, and 29 trucks. The underground operation reported a small tonnage shot from the solid or cut by hand. One preparation plant using heavy media equipment was in operation. One tipple reported crushed coal tonnage and a small amount of coal treated with oil. Crushed limestone for concrete aggregate and roadstone was reported by Lycoming Silica Sand Co. from their Salona quarry. Flint block and nodular clay was produced by F. E. Fink and R. H. Stackhouse at a strip mine near Farrandsville, trucked to Monument for firing, and then trucked to various customers for use as mortars, castable mixes, and high alumina brick. Shale was produced by Mill Hall Clay Products, Inc., near Castanea for the manufacture of heavy clay products. Flint clay was produced by R. C. Gillen & Son near Lock Haven for high alumina brick and foundries, and by Peter M. Evock near Renovo for firebrick and block.

Columbia.—Anthracite production decreased approximately 26 percent in tonnage and 28 percent in value from that of 1964. Sand and gravel for building purposes was produced by Bloomsburg Sand & Gravel Co., Inc., and was processed at a stationary plant near Bloomsburg. A. Barletta & Sons produced sand and gravel near Mifflinville for paving purposes. Baker Stone Co. produced crushed limestone near Bloomsburg for the manufacture of quicklime and a small amount of hydrated lime for agricultural purposes. Shale was produced for manufacturing building brick by The Alliance Clay Product Co. near Mifflinville. Benton Peat, Inc., produced moss and humus peat for general soil improvement from a bog near Benton.

Crawford.—Increased demand for sand and gravel for paving purposes by local townships and Pennsylvania Department of Highways was atrributed to an output more than double that of 1964. Sand and gravel producers were W. L. Dunn, Cochranton; Conneaut Lake Sand & Gravel,

Inc., Conneaut Lake; and Hasbrouck Sand & Gravel, Titusville.

Cumberland.—Improved construction activity was reflected by an increase in crushed limestone production, chiefly for concrete aggregate and roadstone. Major producers of limestone were Hempt Brothers, Inc., with quarries near Camp Hill and Harrisburg, and Valley Quarries, Inc., near Shippensburg. Three companies reported sand and gravel production for building and paving purposes, two companies near Mt. Holly Springs, and one near Walnut Bottom. Philadelphia Clay Co., Mt. Holly Springs, reported kaolin production for portland and other hydraulic cement manufacture. Penn Products Corp., Boiling Springs, mined fire clay for use in floor and wall tile.

Dauphin.—Crushed limestone for hearth furnace flux, concrete aggregate, roadstone, and some quicklime was produced by H. E. Millard Lime & Stone Co., near Palmyra. Crushed limestone for concrete aggregate and roadstone was also produced by Hempt Bros., Inc., near Steelton and George E. Ebersole & Sons near Hummelstown. Basalt trap rock was quarried and crushed for concrete aggregate and roadstone by Faylor Lime & Stone Co. near Elizabethville. Anthracite production decreased 25 percent from that of 1964. The Glen Gery Shale Brick Corp., mined shale near Harrisburg and Middletown for manufacturing building brick. Sand and gravel was produced by Pennsy Supply, Inc., near Duncannon for building and paving purposes.

Delaware.—The General Crushed Stone Co. near Glen Mills and V. Di Francesco & Sons near Havertown quarried crushed basalt for concrete aggregate and roadstone. Dimension sandstone for construction work was produced by Media Quarry Co. near Media. Miscellaneous dimension stone was produced near Marple, Broomall, and in Springfield Township. Dimension granite was produced near Swarthmore and Lima. Perlite Products Co. expanded perlite at its Primos plant chiefly for use in building plaster. Sinclair refining Co. and the Sun Oil Co. recovered sulfur in the liquid purification of oil refinery gas at Marcus Hook.

Elk.—Bituminous coal was produced a 24 operations; 12 underground, 8 strip, an 4 auger. Production totaled 516,000 tons, 17-percent increase over that of 1964. Stri mines accounted for 332,000 tons and re ported 16 power shovels, 4 draglines, 1 bulldozers, 3 power drills, and 20 trucks Of the 12 underground mines, 6 loade 93,000 tons mechanically with 2 mobil loaders, and 8 hand-loaded face conveyors Fifteen cutting machines cut 112,000 tons Auger mines reported four augers, on power shovel, three bulldozers, and seve trucks. No preparation plants were report ed in operation, but two mine tipple crushed 177,000 tons of coal. Crushe quartzite for concrete aggregate and road stone was produced by Clark Constructio Co. near Johnsonburg. Artificial graphit was produced by Speer Carbon Co., a divi sion of Air Reduction Co., Inc., at a plan near St. Mary's.

Erie.—Production of sand and gravel in creased 17 percent in tonnage over that o 1964. Erie Sand Steamship Co. at Erie pro duced large tonnages of sand for buildin purposes. Nickel Plate Sand & Gravel Co near Fairview produced sand and grave for building and paving purposes and anti skid uses. Clark Construction Supply Co. Inc., near Erie produced sand and grave mostly for ready-mixed concrete. A. Du chini, Inc., produced unprocessed grave for fill near Erie. Peerless Mineral Product Co. produced industrial sand nea Springfield for foundry uses. Corry Peat Products Co. produced mostly reed-sedge peat for general soil improvement nea Corry.

Fayette.—Bituminous coal was produced at 49 operations; 24 underground, 24 strip, and 1 auger. Production totaled 1.2 million tons, a 34-percent decrease from that of 1964. Five of the 24 underground mines loaded 681,000 tons of coal mechanically with 9 continuous miners and 7 mobile loaders (of which 5 were used with continuous miners). Strip mines accounted for 436,000 tons and reported 23 power shovels, 5 draglines, 17 bulldozers, 9 power drills, and 20 trucks. Auger mines reported one auger, one power shovel, two bulldozers, one power drill, and two trucks. Four preparation plants prepared 5.7 million tons of clean coal, mostly from underground mines in Greene and Washington

ounties. Four mine tipples crushed 35,000 tons.

Crushed sandstone (bluestone) was produced by the Connellsville Blue Stone Co. ear Connellsville for concrete aggregate nd roadstone. General Refractories produced crushed quartzite for silica brick ear Layton. Crushed limestone was produced by the Appalachian Stone Division f Martin Marietta Corp. for concrete ggregate and roadstone from its Lake ynn and Uniontown operations. Their ake Lynn operation was recognized for its utstanding safety record in 1965.

Plastic and flint fire clay was produced y Kaiser Refractories, Division of Kaiser luminum & Chemical Corp., Near Ohioyle and Robert H. Mathews near Uniontown for firebrick and block. Harbison-Walker Refractories Co. produced flint fire lay near Ohiopyle for firebrick and block. Miscellaneous clay was produced by Layton ire Clay Co. near Layton for building rick. Sand and gravel for building and aving purposes was produced by McClain and Co., Inc., near Point Marion.

Forest.—Tionesta Sand and Gravel, Inc., roduced processed sand and gravel for uilding and paving purposes at a stationry plant near Tionesta.

Franklin.—Crushed limestone chiefly for oncrete aggregate and roadstone uses was roduced by Valley Quarries, Inc., near Chambersburg and Pinola; Appalachian Stone Division, Martin Marietta Corp. ear Williamson and Zullinger; and New Enterprise Stone & Lime Co. near Dry Run. Some crushed limestone for agricultural purposes was also produced at Williamson, Pinola, and Dry Run. Dimension sandstone for construction work was produced by J. R. Zeek near Carstown. Processed sand for building purposes was produced by Mt. Cydonia Sand Co., Inc., near Fayetteville. Caledonia Sand Co. produced unprocessed sand for concrete products, blocks, and tanks, near Fayetteville.

Fulton.—Crushed limestone for concrete aggregate, roadstone, and agricultural purposes was produced by H. B. Mellott Estate, Inc., at their Morton quarry near Big Cove Tannery, and Charlton quarry near Warfordsburg. Sand was produced for paving purposes by H. B. Mellott Estate, Inc., at its operation near Warfordsburg.

Greene.—Bituminous coal was produced at 36 operations; 29 underground and 7 strip. Production totaled 12.3 million tons, a 7-percent increase over that of 1964. Most of the tonnage was from underground mines and not sold in the open market. Eighteen of the 29 underground mines loaded 12.2 million tons of coal mechanically with 87 continuous miners and 50 mobile loaders, (of which 42 were used with continuous miners). Fifteen cutting machines cut 156,000 tons. Strip mines reported eight power shovels, seven bulldozers, one power drill, and four trucks. Four preparation plants prepared 6.6 million tons of clean coal, all of which was mined underground. Five plants crushed 5.1 million tons and two plants treated 1.1 million tons with oil. The Robena No. 4 mine of the United States Steel Corp. has been awarded the "Sentinels of Safety" trophy for having attained the best safety record in the Underground Coal Group of the 1965 National Safety Competition.

Miscellaneous clay and shale was mined near Waynesburg for use in manufacturing building brick.

Huntingdon.—Industrial ground and unground sand was produced by Pennsylvania Glass Sand Corp., at its Keystone Works near Mapleton Depot. for a wide range of uses but mostly for glass. Crushed limestone for concret aggregate, roadstone, and agricultural purposes was produced by L. H. Parsons Stone & Lime Co. at its Shade Gap plant near Orbisonia. Crushed limestone was also produced near Union Furnace and McConnellstown. Harbison-Walker Refractories Co. near Mt. Union and the North American Refractories Co. near Three Springs produced crushed quartzite for silica brick.

Bituminous coal was produced at eight operations; five underground, two strip, and one auger. Production totaled 66,000 tons, a 3-percent decrease from that of 1964. Strip mines accounted for 55,000 tons and reported four power shovels, two draglines, three bulldozers, two power drills, and five trucks. Three of the five underground mines loaded 4,700 tons of coal mechanically with three hand-loaded face conveyors. The auger mine reported one auger. No preparation plants were reported in operation, but one mine tipple crushed and treated coal with oil. Plastic fire clay

was produced by Alexandria Fire Clay Co. from its opencut mine near Alexandria for sale to refractory mortar producers.

Indiana.—Bituminous coal was produced at 97 operations; 63 underground, 30 strip, and 4 auger. Production totaled 6.6 million tons, a 20-percent increase over that of 1964. Forty of the 63 underground mines loaded 5.7 million tons of coal mechanically with 67 continuous miners, 32 mobile loaders, (of which 9 were used with continuous miners), and 12 hand-loaded face conveyors. Fifty-five cutting machines cut 647,000 tons. Strip mines accounted for 746,000 tons and reported 36 power shovels, 12 draglines, 2 carryall scrapers, 32 bulldozers, 7 power drills, and 87 trucks. Auger mines reported four augers, three bulldozers, and four trucks. Sixteen preparation plants prepared 5.0 million tons of clean coal, all of which was produced underground. twenty-five mine tipples crushed 3.2 million tons and seven plants treated 689,000 tons with oil and other materials.

Plastic fire clay was produced by Hiram Swank's Sons, Inc., and L. H. Foehrenbach near Clymer for use in manufacturing a variety of clay refractory products.

Jefferson.—Bituminous coal was produced at 63 oprations; 22 underground, 36 strip, and 5 auger. Production totaled 1.8 million tons, a 3-percent decrease from that of 1964. Strip mines accounted for 1.0 million tons and reported 58 power shovels, 18 draglines, 47 bulldozers, 4 power drills, and 127 trucks. Fifteen of the 22 underground mines loaded 712,000 tons of coal mechanically with 9 continuous miners, 1 duckbill, and 18 hand-loaded face conveyors. Thirty-one cutting machines cut 170,000 tons. Auger mines reported six augers, one power shovel, four bulldozers, and seven trucks. Five preparation plants prepared 975,000 tons of clean coal, of which 725,000 tons was mined underground. Fifteen mine tipples crushed 760,000 tons and four plants treated 187,000 tons with calcium chloride.

Miscellaneous clay was produced at an underground and opencut mine near Brockway by the Brockway Clay Co. for the manufacture of vitrified sewer pipe. Plastic fire clay was produced by Hanley Co. at Summerville for the manufacture of building brick. Crushed limestone, chiefly for agricultural purposes, was produced b Sugar Hill Limestone Co. near Brockway.

Juniata.—Crushed limestone for concre aggregate and roadstone was produced b Juniata Limestone Co. near McAllisterville Crushed limestone was produced for th manufacture of quicklime used for agricu tural purposes by Fulkroad Lime Quar near McAllisterville.

Lackawanna.—Anthracite production wa 705,000 tons, 216,000 tons less than that 1964. Sand and gravel for building an paving purposes was produced by Contra tors Sand & Gravel, Inc., near Moscov Reed-sedge peat was produced by Lak Linda Peat Co., Inc., from a bog near Da ton.

Lancaster.—The county ranked second i the production of limestone in the Stat with 3.6 million tons of crushed limeston chiefly for concrete aggregate and roac stone. The largest producer was D. M Stoltzfus & Son, with quarries near Ta mage, Quarryville, and Cedar Hill. Othe large limestone producers were Ivan M Martin, Inc., near Blue Ball; Binkley an Ober, Inc.; near East Petersburg; Compas Quarries, Inc., near Gap; and A. G. Kurt & Sons, Inc., near Denver.

Anthracite dredged from the Susquehan na River increased production slightly ove that of 1964. Plastic fire clay was produce by Narvon Mines, Ltd., near Narvon for variety of uses but mainly for a minera filler. Miscellaneous clay and shale wa produced by Glen Gery Shale Brick Corp near Ephrata, Lancaster Brick Co., nea Lancaster, and Roger Gerhart near Litit for the manufacture of building brick.

Sand was produced by Milton Grov Sand, Inc., near Milton Grove for buildin and paving purposes. Sand was also pro duced near Brownstown and Honey Brook Amos K. Stoltzfus produced agricultura quicklime near Elverson.

Lawrence.—Portland and masonry ce ments were produced by the Bessemer Ce ment Co., Division of Diamond Alkali Co at Bessemer, and the Medusa Portland Ce ment Co. at Wampum. Most of the pro duction was general use and moderate hea (air-entrained) portland cement, althougl both companies also produced high-early strength cement. Most of the shipment were made in bulk by trucks to ready

ixed concrete companies. Crushed lime-one production totaled 3.3 million tons. he leading producer was United States eel Corp., with a quarry near Hillsville, roducing stone for blast furnace flux and ment manufacture. Besides the limestone roduced by the two cement companies, entioned above, crushed limestone was so produced by New Castle Lime & Stone o. in Mahoning Township for concrete ggregate, roadstone, agricultural purposes, al mine dust, and fillers.

Bituminous coal was produced at 24 perations; 1 underground, 21 strip, and 2 ager. Production totaled 906,000 tons, an percent increase over that of 1964. Strip ines accounted for 884,000 tons and re-orted 21 power shovels, 20 draglines, 34 ulldozers, 10 power drills, and 42 trucks. he underground mine cut a small ton-age of coal with one cutting machine. uger mines reported three augers and one ulldozer. Coal crushed at five mine tipples taled 261,000 tons. Reed-sedge peat was ecovered by D. M. Boyd Co. and Moore's umus & Nursery from bogs near Lees-urg. The Moore's Humus & Nursery was ctive until June 1, then sold to Welker reenhouses of New Castle. Zonolite Div., V. R. Grace & Co., produced exfoliated ermiculite at its Ellwood City plant hiefly for use as loose-fill insulation.

Plastic fire clay was produced by Ralph . Veon, Inc., and The Negley Fire Clay o., both of Enon Valley; Jack Craig Coal Clay Co., near Wampum; and McQuis-on Coal Co., near Bessemer, mostly for the anufacture of building brick. Shale was roduced by cement companies for use in ortland cement and by Fenati Brick Co., nc., near New Castle for the manufacture f building brick. The McQuiston Coal Co. lso produced shale for the manufacture of uilding brick.

Increase of building in the area and tate approval of material for road con-truction stimulated the sand and gravel ndustry in the county and accounted for he largest annual sand and gravel output n record. Mahoning Valley Sand Co. pro-uced sand and gravel near West Pittsburg or building and paving purposes, fill, and ntiskid uses. Superior Sand & Supply Co. ear New Castle produced sand and gravel or building and paving purposes and ravel for fill. Mooney Bros, Supply Co. near New Castle produced sand for fill and gravel for drainage.

Lebanon.—Bethlehem Mines Corp. mined magnetite iron ore at Cornwall and processed the crude ore at its Cornwall concentrator. The magnetite was recovered by crushing, grinding, magnetic separation, and agglomeration. Valuable byproducts, recovered by flotation, included gold, silver, copper, pyrite, and cobalt. The No. 4 Cornwall mine of the company has been awarded the "Sentinels of Safety" trophy for having attained the best safety record in the Underground Metal Mine Group of the 1965 National Safety Competition for operating throughout the year without a disabling work injury. In addition to the trophy, the Bureau of Mines awarded Certificates of Accomplishment in Safety to each official and employee of the operation.

Production of crushed limestone slightly increased in 1965 over that of 1964. H. E. Millard Lime & Stone Co. produced crushed limestone mostly for its own quicklime and hydrated lime production near Annville, in addition to the stone sold for cement manufacture, agricultural purposes, and metallurgical flux for open hearth plants. Calcite Quarry Corp., produced crushed limestone near Lebanon, chiefly for concrete aggregate, roadstone, metallurgical flux, and cement manufacture. Fiala, Inc., near Annville produced crushed limestone for cement manufacture and metallurgical flux. Pennsylvania Aggregates, Inc., near Cornwall and Sheridan Slag Co. near Lebanon produced crushed limestone for concrete aggregate and roadstone. Dimension limestone was produced by Jonas E. Wenger near Myerstown. Anthracite production was slightly lower than that of 1964. The Paul Kerrigan Coal Co. operated two strip mines. The Whitmoyer Laboratories, Inc., consumed crude iodine in manufacturing inorganic and organic compounds at its plant near Myerstown.

Lehigh.—Portland and masonry cements were produced by Lehigh Portland Cement Co. near Fogelsville, and Coplay Cement Manufacturing Co. near Coplay. Portland cement was also produced by the Whitehall Cement Manufacturing Co. near Cementon, and Giant Portland Cement Co. near Egypt. Most of the portland cement was shipped in bulk by truck to ready-mixed concrete companies and concrete

rels of portland cement. All but one plant also shipped masonry cement. Producers were Keystone Portland Cement Co., Bath; Hercules Cement Co., Division of American Cement Corp., Stockertown; Universal Atlas Cement Division, United States Steel Corp., and Dragon Cement Co., Division of Martin Marietta Corp., both of Northampton; Lone Star Cement Corp., Penn-Dixie Cement Corp., and Nazareth Cement Co., all of Nazareth; and National Portland Cement Co., Bethlehem. Ready-mixed concrete companies purchased most of the cement, with a significant quantity purchased by concrete product manufacturers. Alpha Portland Cement Co. abandoned its plant at Martins Creek, but reported sales from its cement stocks. Thirty-four kilns were used during the year. Most of the Eastern States received cement shipments from the county.

Production of crushed limestone increased 3 percent in tonnage as the county continued to be first in the State. Captive limestone and cement rock produced by cement manufacturers for their own use was the largest portion of the crushed limestone output. Other companies producing crushed limestone were Bethlehem Mines Corp. near Bethlehem and the Trumbower Co., Inc., near Nazareth, mostly for concrete aggregate and roadstone, but Bethlehem also produced some stone for clay filler, stone sand, railroad ballast, agricultural purposes, and riprap.

Dimension slate was produced mostly for flagging, structural and sanitary ware, blackboards, and roofing. Leading dimension slate producers were Capitol Slate Co., Inc., near East Bangor; Albion Vein Slate Co., Anthony Dally & Sons, Inc., and Stephens-Jackson Co., all of Pen Argyl.

Two producers reported crushed slate production, the leading one being Pennsylvania Lightweight Aggregate, Inc., near Bangor, with most of the output used for lightweight aggregate plus a small quantity used for roofing granules.

Production of sand and gravel was slightly less than that of 1964. Output was chiefly for building and paving purposes. Companies active included Houdaille Construction Materials, Inc., Portland; Lehigh Valley Sand & Gravel Co., Inc., Easton; and W. J. Lowe & Sons, Inc., Bangor.

Minerals, Pigments, & Metals Division, Charles Pfizer and Co., Inc., at Easton, and Reichard-Coulston, Inc., at Bethlehem produced finished (natural and manufactured) pigments.

Northumberland.—Anthracite production totaled almost 1.6 million tons, a 26-percent decrease from that of 1964. The Alarcon Coal Co.'s Treverton mine received recognition for its safety record in the Underground Coal Group of the 1965 National Safety Competition for working 31,138 man-hours without a disabling work injury.

Shale was produced for manufacturing building brick by Glen Gery Shale Brick Corp. and Watsontown Brick Co. Watsontown Minerals Products produced shale for linoleum filler. All operations were near Watsontown. Crushed limestone for concrete aggregate, roadstone, and agricultural purposes was produced by Eugene Meckley at a stationary plant near Herndon. Clyde Starook produced a small amount of burnt lime for agricultural use near Northumberland.

Perry.—Crushed limestone for concrete aggregate and roadstone was produced by Bradford Hills Quarry, Inc., at its Newport quarry.

Philadelphia.—The Liberty Corp. Operated a dredge on the Delaware River and a stationary plant near Philadelphia to produce sand and gravel for building purposes. The Atlantic Refining Co. recovered hydrogen sulfide and molten sulfur, and Gulf Oil Co. recovered sulfur, both operations near Philadelphia. Hydrogen sulfide was recovered by the Girdler system using monethanolamine and diethanolamine, and sulfur was recovered by the Claus process. Calcined gypsum (stucco) was produced by United States Gypsum Co. near Philadelphia.

Potter.—Dimension sandstone was reported from quarries near Austin, Bark Shanty, Coudersport, Gold, Roulette, and Wharton, mostly for flagging. Penn Kress Flagstone Co., Inc., was the largest producer. Lloyd A. Tyler, John Majot, and McCloskey's Stone Quarry reported tonnages for the first time.

Schuylkill.—Anthracite production decreased 10 percent from that of 1964. Leading producers were Reading Anthracite

Co., Greenwood Stripping Corp., and Gilberton Coal Co.

Crushed sandstone was produced near Summit Station for concrete aggregate and roadstone by Summit Quarries, Inc. Harbison-Walker Refractories Co. produced crushed sandstone near Andreas for silica brick. Crushed limestone was produced by Huss Contracting Co. near Andreas for concrete aggregate and roadstone. Sand for paving purposes and industrial sand for fire or furnace was produced by Refractory Sand Co., Inc., at a stationary plant near Andreas. Shale was purchased from various producers for the manufacture of lightweight aggregate by Lehigh Materials Co., near Tamaqua. Auburn Brick Co. produced shale for manufacturing building brick near Auburn.

Snyder.—Crushed limestone was produced near Paxtonville by National Limestone Quarry, Inc., for concrete aggregate, roadstone, and agricultural purposes. Carton L. Comfort produced crushed limestone for use in making quicklime of his own manufacture at a quarry near Mt. Pleasant Mills, but terminated operations during the year.

Sand and gravel was produced near Selinsgrove by Central Builders Supply Co. for building and paving purposes, fill, highway maintenance, and manufacturing concrete masonry units. Anthracite production was about the same as that of 1964.

Somerset.—Bituminous coal was produced at 127 operations, 63 underground and 64 strip. Production totaled 3.7 million tons, an 18-percent increase over that of 1964. Strip mines accouned for 2.4 million tons and reported 81 power shovels, 61 draglines, 87 bulldozers, 29 power drills, and 165 trucks. Twenty of the 63 underground mines loaded 982,000 tons of coal mechanically with 15 continuous miners and 21 hand-loaded face conveyors. Fifty-nine cutting machines cut 385,000 tons. Nine preparation plants prepared 1.5 million tons of clean coal, 1.0 million tons of which was strip coal and 0.5 million tons was underground coal. Twenty mine tipples crushed 1.8 million tons, and nine plants treated 152,000 tons with oil.

Flint fire clay was produced by General Refractories Co. near Fort Hill and Rockwood for manufacturing firebrick and block. Plastic fire clay was produced by Otto Brick and Tile Works, Inc., near Springs for manufacturing building brick; by Harbison-Walker Refractories Co. near Somerset for firebrick and block; and by C. Brant Mining Co. near Somerset for firebrick and high alumina brick. Svonavec Coal Co. produced flint fire clay near Shanksville for firebrick and block. Hiram Swank's Sons, Inc., operated an underground mine near Holsopple producing plastic fire clay for manufacturing firebrick and block.

Crushed limestone for concrete aggregate and roadstone was produced by Somerset Limestone Co., Inc., near Bakersville. Keystone Lime Co. produced crushed limestone near Springs for concrete aggregate, roadstone, and agricultural purposes. Crushed sandstone was produced by Detwilers Industries, Inc., near Central City and by Clarence Rodamer near Springs for concrete aggregate and roadstone. Sand and gravel was produced near Berlin and sand was produced near Boswell for construction purposes.

Sullivan.—Anthracite production was 23,000 tons compared with 16,000 tons in 1964, an increase of more than 40 percent. Bliss Coal Co., E. and B. Coal Sales, Meg Coal Co., and James and Albert Oliver operated strip mines.

Susquehanna. — Dimension standstone mostly for flagging purposes was reported by seven companies with quarries near Harford, Kingsley, Montrose, Rush Township, Springville, and Susquehanna. Crushed sandstone for concrete aggregate and roadstone was reported by Keelor Supply Co., Inc., near Clifford and Susquehanna Quarry Co. near Montrose. Anthracite was produced by Matisko Coal Co.

Tioga.—Bituminous coal was produced at three operations, one underground and two strip. Strip mines accounted for most of the production and reported 9 power shovels, 6 draglines, 10 bulldozers, 3 power drills, and 9 trucks. The underground mine shot coal from the solid or cut by hand. One preparation plant cleaned coal with pneumatic equipment and crushed most of the strip production.

Sand and gravel output from Fredric M. Gee Gravel Co.'s portable plant near Middlebury Center almost tripled that of 1964, principally because of the increased use of paving gravel by the Pennsylvania Department of Highways. A small amount